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THESIS

THE RESERVE PERSONNEL, NAVY MANYEAR RATE ACTIVITY-BASED COSTING MODEL

by

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June 1995

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THE RESERVE PERSONNEL, NAVY MANYEAR RATE ACTIVITY-BASED COSTING MODEL

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This thesis presents an activity-based costing model for the Reserve Personnel, Navy (RPN) Budgeting Office. The purpose of the model is to arrive at a more refined cost estimate to charge resource sponsors for fixed and discretionary support costs for reserve personnel. The model can be used for budgeting, target costing, process improvement, and strategic planning. The RPN Manyear Rate Activity-Based Costing Model is a flexible and responsive tool that uses an activity-based costing software package. The output of the model is Trained SELRES Performing Annual Training Requirements. The model traces all the activities required to produce that output. The model identifies the annual cost, unit cost, and unit activity cost for each output.

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I. INTRODUCTION

A. GENERAL

Each year Congress appropriates funds to finance the cost of reserve personnel serving in the Department of Defense (DoD). The Navy's congressional appropriation for reserve personnel cost is the Reserve Personnel, Navy (RPN) account. The RPN appropriation budget is the primary financial plan developed to support the reserve component manning of the approved force structure. The RPN appropriation provides funding for the pay, allowances, clothing, subsistence, gratuities, travel, per diem and other related expenses for Naval Reservists performing Active Duty Training (ADT) or Inactive Duty Training (IDT).

Appropriations are divided into accounts called Budget Activities (BA), which appear in the program and financing schedule of the President's budget. The RPN appropriation is divided into two main budget activities. The first, Unit and Individual Training, falls under Budget Activity 1(BA1). The second BA, Other Training and Support, falls under Budget Activity 2 (BA2). Each of these BA's are further divided into subactivities. BA1 is divided into three pay groups: pay group A, pay group B, and pay group F. BA2 is divided into 10 subactivities: Mobilization Training, School Training, Special Training, Administration and Support, Education Benefits, Senior Reserve Officers' Training Corps, Scholarship Program, Junior Reserve Officer Training Corps, Reserve Officer Candidates, and Armed Forces Health Professions Scholarship Program (NAVCOMPT 1992). This thesis will be limited to developing a manyear rate costing model for Pay Group A in BA1.

B. BACKGROUND

The RPN appropriation process is initialized when resource sponsors submit their personnel requirements to the

Chief of Naval Operations (CNO). The request is submitted to congress to authorize and appropriate funds which allow resource sponsors to "buy" an authorized end strength. The funds authorized are based on a fixed Manyear Average (MYA) rate calculation that, in recent years, have not accurately reflected the true cost of "buying" a Selected Reservist (SELRES). This inaccurate MYA rate calculation, along with various other unanticipated situations, such as the increased use of reservists for peacetime support, caused the Naval Reserve running out of RPN funds in the fourth quarter of the 1994 Fiscal Year. This situation resulted in the cancellation of all paid weekend drills in the final week of the 1994 fiscal year. These lost drill weekends affected nearly 22,500 reservists by jeopardizing their drill pay opportunities and retirement drill credit (Garrison 1994).

C. OBJECTIVE

The objective of this thesis is to construct a Reserve Personnel Navy (RPN) Manyear Rate Activity-Base Costing Model for use in budget planning. The purpose of this model is to arrive at a more refined cost estimate to charge resource sponsors for fixed and discretionary support costs for reserve personnel. These models are intended for use by the Commander, Naval Reserve Force RPN Budget Officer for budget submission.

D. SCOPE, LIMITATIONS, AND ASSUMPTIONS

The main focus of this study is to develop a costing model that accurately reflects the cost of "buying" a reservist. This thesis is limited to analyzing RPN costs in Budget Activity 1 (BA1), Unit and Individual Training, in Pay Group A (BA1-A). Pay Group A are personnel that are required to perform training duty of two weeks duration and to perform a minimum of 48 drills per year. In addition, personnel from Pay Group A who are in the combat components of the surface reserve and in selected aviation groups are authorized to participate in additional training periods (ATP) in order to

maintain proficiency.

The costs included in BA1-A are basic pay, basic allowance for quarters, basic allowance for subsistence, the government's contribution to Social Security and retirement accrual, individual clothing and uniform gratuities for officers and enlisted personnel, subsistence-in-kind for enlisted personnel, travel to and from Annual Training (AT), and travel to and from alternate Inactive Duty Training Travel (IDTT) sites (COMNAVRESFOR 1995).

The purpose of this model is limited for use to estimate costs required for a specific end strength. The model can be used to trace cost down to an activity within a rank. Also, the model can be used to perform sensitivity analysis given fluctuations in fixed costs, discretionary costs, inputs or changes in the environment. The model also excludes the costs of reservists on active duty in connection with the Training and Administration of Reserves (TAR's).

E. LITERATURE REVIEW AND METHODOLOGY

The methodology by which data were collected for this thesis consisted of interviews, literature searches, and collection of official data. Various official sources provided documentation including Department of the Navy (DON) reports, instructions, and memoranda. The Fiscal Year 1996/1997 Budget Estimates for the Office of the Secretary of Defense/Office of Management and Budget and various other budget estimates were obtained from Commander, Naval Reserve Force RPN Budget Office (N82). Background documentation and official presentation printouts were provided by Commander, Naval Surface Reserve Force Budgeting Office. These documents provided insight into how MYA are currently calculated and requirements for budget submission.

Interviews were conducted with various budgeting personnel at the Naval Reserve Headquarters in New Orleans, Louisiana. These interviews provided insight into the entire

RPN budgeting process. This data provided the necessary background for developing a RPN Manyear Rate Activity-Based Costing Model.

F. THESIS ORGANIZATION

This thesis is presented in five chapters with supporting appendices. Chapter I presents a general discussion and brief background on RPN. It also presents the objective of the thesis and discusses the research question.

Chapter II presents a general discussion of the Naval Reserve, the structure of the Naval Reserve, and the roles and responsibilities of key players in the RPN appropriation.

Chapter III provides a description of the BA1-A portion of the RPN appropriation, presents the background of the recent problems in managing the RPN appropriation, provides possible explanations for the problems, and examines the need for a simplified and flexible cost model.

Chapter IV presents the basic BA1-A RPN Manyear Rate Activity-Based Costing Model, examines the inputs, outputs, activity flows, discusses the assumptions made, and presents a discussion of model validation and scenario playing.

Chapter V provides the conclusions and recommendations of this study. Conclusions are drawn from the model and recommendations are made regarding implementation and various uses of the model.

The appendices present the basic model and details of each activity flow within the model.

II. THE NAVAL RESERVE

A. GENERAL

The overall mission of the Navy is prescribed by Title 10, U.S. Code, which states, "... be prepared to conduct prompt and sustained combat operations at sea in support of the U.S. national interests." As defined in Section 262 of Title 10, U.S. Code, the mission of the Naval Reserve is to "... provide trained units and qualified persons available for active duty in the armed forces, in time of war or national emergency and at such other times as the national security requires." As the current trend of downsizing the active component of the armed forces continues, the need to use the Naval Reserve for peacetime contributory support will increase to an unprecedented level. Peacetime contributory support is a term used to describe the utilization of reservists to perform readiness-related activities supporting the mission needs of the active forces. With the surge in the employment of the Naval Reserve, a flexible and responsive RPN cost model will be valuable in determining the cost of a desired end strength.

For the first 140 years of its existence, the United States Navy lacked a formal reserve program. On March 3, 1915, with World War I developing in Europe, Congress, at the urging of Navy Secretary Josephus Daniels and Assistant Secretary Franklin D. Roosevelt, created the Federal Naval Reserve. In 1916, Congress passed a second law redefining and establishing the Naval Reserve Force. Over the past eight decades, the Naval Reserve has evolved into a well-structured and highly qualified component of the armed forces (COMNAVRESFOR PAO 1994).

B. STRUCTURE OF THE NAVAL RESERVE

In order to understand RPN in detail, it is essential to have an appreciation of the structure of the Naval Reserve and

the roles and responsibilities of the main players in the RPN budgeting game. This section outlines the structure and briefly explains the roles of each element of the Naval Reserve.

1. Ready Reserve

This component of the Naval Reserve consists of the Selected Reserve and the Individual Ready Reserve who are liable to report to active duty in time of war or national emergency under 10 U.S.C. 652 and 673.

a. Selected Reserve (SELRES)

The SELRES are units and individuals designated by the Chief of Naval Operations and approved by the chairman, Joint Chiefs of Staff as so essential to initial wartime missions that they have priority over all other reserves. The SELRES are the "backbone" of the Naval Reserve. All SELRES are in an active status and are required to participate in Annual Training (AT) and Inactive Duty Training (IDT).

(1) Full Time Support (FTS) Personnel. FTS are full-time active duty personnel, both Naval Reserve and regular Navy, assigned to support the Naval Reserve. FTS includes those in the Training and Administration of Reserves (TAR) program.

(2) Selected Reserve Units. SELRES units are manned and equipped to serve and/or train as commissioned or augmentation units. Commissioned units are fully operational units possessing their own organic equipment such as aircraft squadrons, ships, hospitals and Reserve command operational staffs. These commissioned units are assigned to deliver a complete, operational entity to the fleet. Augmentation units are similar to commissioned units, in that they train together, but differ when mobilized, because they lose their unit identity and become part of an active component.

(3) Individual Mobilization Augmentees (IMA). IMA's are drilling reservists trained and preassigned to a

mobilization billet at an active component, such as the Federal Emergency Management Agency (FEMA). These individuals are responsible for filling these billets on, or shortly after, mobilization has been ordered. Like SELRES, IMA's are required to perform a minimum of 14 days AT and 48 IDT drills each year.

b. Individual Ready Reserve (IRR)

The composition of the IRR is principally former active duty or SELRES members who still retain a military service obligation or contractual commitment. With the single exception of the Presidential Selected Reserve Call-up Authority (PSRC), the IRR is subjected to recall for mobilization on the same basis as the SELRES.

2. Standby Reserve

The Standby Reserve is composed of personnel who maintain their military affiliation without being in the Ready Reserve. They are a pool of trained individuals who may be mobilized as needed to fill manpower needs in specific skills, but are not part of any specific unit and are not required to train.

3. Retired Reserve

The Retired Reserve is made up of retired USNR. They may voluntarily train with a unit when they have premobilization orders.

4. Fleet Reserve

The Fleet Reserve is a valuable asset in that these members can, without additional training, fill billets requiring experienced personnel. Upon completion of 30 years of total service, Fleet Reserve personnel transfer to the Retired Reserve. The Fleet Reserve can only accept Regular Navy or Naval Reserve active duty members with a minimum of 20 years of active service (OPNAVINST 1001.21A 1993).

C. ROLES AND RESPONSIBILITIES

The following personnel and organizational units play key roles in the Naval Reserve and the RPN appropriation.

1. Chief of Naval Operations (CNO)

The CNO is ultimately responsible for the organization, administration, training and equipping of the Naval reserve. Additionally, the CNO is responsible for mobilization planning to effectively reinforce and augment active forces in time of war or national emergency.

2. Resource Sponsors

Resource sponsors are Assistant Chiefs of Naval Operations (ACNOs), Deputy Chiefs of Naval Operations (DCNOs), or Directors of Major Staff Offices (DMSOs), who resource reserve manpower for their respective programs. Mobilization requirements are identified by Fleet Commanders in Chief and required reserve manpower is requested through their respective Immediate Superior In Command (ISIC). Resource sponsors coordinate with the Director, Naval Reserve (N095) on all matters pertaining to their Naval Reserve programs.

3. Naval Comptroller (NAVCOMPT)

NAVCOMPT is responsible for the financial management of the Navy, including budgeting, accounting, disbursing, financing, internal review, and progress and statistical reporting. RPN appropriation funds are distributed by NAVCOMPT to the following major claimants: Commander, Naval Medical Command (COMNAVMEDCOM), Chief of Naval Personnel(CHNAVPERS), Chief of Naval Education and Training (CNET) and Commander, Naval Reserve Force (COMNAVRESFOR). As depicted by the graph in Figure 2-1 below, a large percentage of the appropriation funds are allocated to COMNAVRESFOR (RPN Brief 1995).

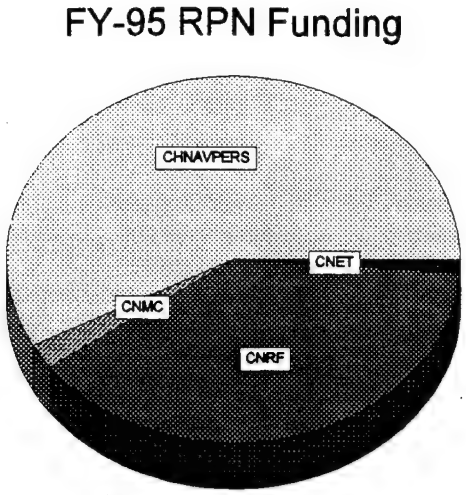

Figure 2-1

4. Chief of Naval Personnel (CHNAVPERS)

Assistant Chief of Naval Personnel for Total Force Programming and Manpower (Pers-51) validates requirements identified by Echelon II commanders for reserve manpower. Echelon II commanders are the fleet commanders. The validation is done through the Navy Manpower Mobilization System (NAMMOS), ship manpower documents (SMD), and squadron manpower documents (SQMD). The Chief of Naval Personnel (Pers-9) is also responsible for the direction and management of the IRR, Stand-by Reserve, and Retired Reserve.

5. Director, Naval Reserve

The command structure of the Naval Reserve is headed by a flag officer who holds two positions: Director of the Naval Reserve (N095) on the staff of the CNO; and Commander, Naval Reserve Force (COMNAVRESFOR), an Echelon II command.

a. Director, Naval Reserve

The Director of Naval Reserve is the principal advisor to the CNO on matters concerning the Naval Reserve. The Director exercises policy, direction, administration, control, and management of the Naval Reserve for the CNO. The duties include establishing the overall strategy and monitoring mobilization readiness of the Naval Reserve. The Director of Naval Reserve also provides budgetary support for activities and programs of the Naval Reserve.

b. Commander, Naval Reserve Force (COMNAVRESFOR)

COMNAVRESFOR is an Echelon II field commander that is responsible for the management and administration of programs and assigned resources within the Naval Reserve. COMNAVRESFOR is directly responsible to the CNO for the proper training of reservists. This training, whenever possible, is to mirror the training received by the active forces. To assist in meeting these various responsibilities, COMNAVRESFOR has two subordinate Echelon III commands that are headed by flag officers:

(1) Commander, Naval Surface Reserve Force. COMNAVSURFRESFOR reports to COMNAVRESFOR on all matters concerning Naval Surface Reserve units. COMNAVSURFRESFOR coordinates with fleet commanders on all matters concerning the readiness and training of Naval Reserve Force (NRF) ships.

(2) Commander, Naval Air Reserve Force. COMNAVAIRESFOR reports directly to COMNAVRESFOR on all matters concerning the Naval Air Reserve Force. COMNAVAIRESFOR is responsible for the operation and maintenance of all aircraft that is in the custody of the Naval Air Reserve Force. This responsibility also extends to the training and readiness of the Naval Reserve aviation units (OPNAVINST 1001.21A 1993).

III. RESERVE PERSONNEL, NAVY APPROPRIATION

A. GENERAL

The Department of Defense Appropriation Act defines the RPN appropriation as follows:

> For pay, allowances, clothing, subsistence, gratuities, travel, and related expenses for personnel of the Naval Reserve on active duty under section 265 of title 10, United States Code, or personnel while serving on active duty under section 672(d) of title 10, United States Code, in connection with performing duty specified in section 678(a) of title 10, United States Code, or while undergoing reserve training, or while performing drills or equivalent duty, and for members of the Reserve Officers' Training Corps, and expenses authorized by section 2131 of title 10, United States Code, as authorized, and for payments to the Department of Defense Military Retirement Fund (NAVCOMPT 1992).

As stated earlier, this thesis focuses only on Budget Activity 1, Pay Group A within the RPN appropriation. This portion of the RPN budget is over 88 percent of the entire COMNAVRESFOR portion of the fund. This is also the portion of the RPN budget that has received most of the attention the last few years (Dalton 1994).

B. BUDGET ACTIVITY 1, PAY GROUP A

Budget Activity 1, Pay Group A (BA1-A) provides all pay and allowance costs for officers and enlisted personnel of the Naval Reserve in training status. Members in BA1-A are required to perform Annual Training (AT) of 2 weeks in duration and to perform a minimum of 48 Inactive Duty for Training (IDT) drills per year. An AT of 2 weeks is equivalent to 14 drill periods. An IDT drill consists of a 4 hour training session, and a drill weekend is made up of 4 IDT drills. BA1-A is made up of the following elements:

1. pay and allowances, AT, officers

2. pay and allowances, AT, enlisted

3. pay and allowances, IDT, officers

4. pay and allowances, IDT, enlisted

5. individual clothing and uniform gratuities, officers

6. individual clothing and uniform gratuities, enlisted

7. subsistence of enlisted personnel

8. travel, AT/IDT, officers

9. travel, AT/IDT, enlisted

1. Pay and Allowances, AT, Officers

These funds provide for the pay and allowances of SELRES officers attending annual training. The rates used in computing requirements includes basic pay, Federal Insurance Contribution Act (FICA) contribution, Retirement Pay Accrual (RPA) contribution, Basic Allowance for Subsistence (BAS), Basic Allowance for Quarters (BAQ), special pay, and incentive pay.

2. Pay and Allowances, AT, Enlisted

These funds provide for the pay and allowances of SELRES enlisted personnel annual training. The rates used in computing requirements includes basic pay, FICA contribution, RPA contribution, BAS, BAQ, special pay, and incentive pay.

3. Pay and Allowances, IDT, Officers

These funds provide for the pay of officers attending inactive duty for training including unit training assemblies and additional training periods. The rate used in computing the requirement includes basic pay, FICA, RPA, special pay, and incentive pay.

4. Pay and Allowances, IDT, Enlisted

These funds provide for the pay of enlisted personnel

attending inactive duty for training including unit training assemblies and additional training periods. The rate used in computing the requirement includes basic pay, FICA, RPA, special pay, and incentive pay.

5. Individual Clothing and Uniform Gratuities, officers

These funds provide for the payment for initial and supplemental clothing allowances to officers for purchase of required uniforms under the provisions of 37 U.S.C. 415 and 416.

6. Individual Clothing and Uniform Gratuities, Enlisted

These funds provide for the payment for initial and supplemental clothing allowances to enlisted personnel for purchase of required uniforms under the provisions of 37 U.S.C. 415 and 416.

7. Subsistence of Enlisted Personnel

These funds provide for subsistence-in-kind for enlisted personnel on annual training and inactive duty training periods of eight hours or more in one calendar day.

8. Travel, AT/IDT, Officers

These funds provide travel and per diem for officers performing AT or IDT. Rates comprise one round trip to training site and return. Travel consists of training away from normal training site to fleet sites for designated units.

9. Travel, AT/IDT, Enlisted

These funds provide travel and per diem for enlisted personnel performing AT or IDT. Rates comprise one round trip to training site and return. Travel consists of training away from normal training site to fleet sites for designated units (COMNAVRESFOR 1995).

C. THE 1994 RPN APPROPRIATION SHORTFALL

In 1994 it became apparent that there was something seriously wrong with the handling of the RPN appropriation. By late summer of 1994, several actions had been taken to avoid the possible over execution of the RPN appropriation. The

initial series of events took place in late August of 1994, and the second took place one month later. The first series of events were internal and focused on variable costs. The latter set looked outward and focused on fixed costs. The following is the sequence of events that actually occurred.

In August of 1994, the RPN shortfall became apparent. In late August 1994, unanticipated expenditures in the area of AT began arriving at the budget office at the Naval Reserve Headquarters in New Orleans. The budget office quickly realized that an over execution of the BA1-A portion of the RPN appropriation was unavoidable. Based on historical data, the budget office anticipated about 1,650 AT orders to be processed during this period, at an estimated cost of $3 million. Unfortunately, approximately 7,300 AT orders were processed at a cost of about $14 million during this period.

Stringent management actions were immediately taken to avoid or reduce the possibility of IDT and AT drill cancellations. The cancellation of drill periods not only has a direct effect on readiness, but also results in financial hardships on personnel, which could result in congressional action. To avoid these implications, COMNAVRESFOR took numerous management actions, which did not require congressional approval, to reduce variable expenditures in an attempt to cover the over executions. Immediately, internal lines of funding from the RPN appropriation were realigned. The following realignments in internal COMNAVRESFOR funding lines were made:

- Transferred $0.6 million from CNET
- Transferred $0.7 million from COMNAVMEDCOM
- Transferred $3.0 million from COMNAVMILPERSCOM
- Reallocated $5.7 million in Reserve Transition Benefits within COMNAVRESFOR

Additionally, COMNAVRESFOR slashed other variable expenditures. Non-essential travel and Active Duty Training (ADT) and additional drill periods were cancelled. These are drills that are above and beyond the normal required drills (Dalton 1994).

By mid-September, when more accurate data was compiled, it was recognized that the original actions were insufficient. It was also very apparent that the RPN appropriation was facing the possibility of an Anti-Deficiency Act violation[1] if no additional actions were taken. In the final weeks of the fiscal year, reprogramming of funds, with the approval of congress, was necessary. Additionally, the need to cancel all drills after 21 September 1994 until the end of the fiscal year was still necessary to squeeze beneath the RPN appropriation limit. Historically, this has only occurred on one other occasion. In May 1980, COMNAVRESFOR announced that regular pay drill periods would be canceled during the months of June and July. Later that summer, funds were reprogrammed from the Operations and Maintenance Navy, Reserve (O&MNR) appropriation to the RPN appropriation to provide retroactive pay for reservists in a pay status.

The reprogramming of funds in the 1994 RPN appropriation transferred $11.999 million from BA-2 to BA-1. The funds were reprogrammed from the following BA-2 programs:

- $2.599 million from CNET by deferring the purchase of uniforms for ROTC midshipmen and the under execution of ROTC summer training.
- $700 thousand from the under execution of the COMNAVMEDCOM Armed Forces Health Scholarship program.

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[1] Anti-Deficiency Act, 31 U.S.C. 1341 prohibits authorizing or incurring obligations or expenditures in excess of amounts apportioned by the Office of Management and Budget or in excess of amounts permitted by agency regulations.

- $3 million from the under execution of the TAR enlisted program. The program was under end strength by 200 enlisted TAR personnel.

- $5.7 million from the under execution of Reserve Transition Benefits resulting from overestimating the number of reservists who would elect benefits in fiscal year 1994.

As stated in the Anti- Deficiency Act, the reprogramming of funds is to be of last resort, after all other available actions have failed to alleviate the problem. Therefore, in late September when the likelihood of an Anti-Deficiency Act violation remained, the only option was to immediately request a reprogramming of funds and to cease further obligations, which included weekend drills and AT (Dalton 1994).

D. EXPLANATIONS FOR THE RECENT SHORTFALL IN THE RPN APPROPRIATION

There seems to be two main explanations for this recent shortfall in the RPN appropriation. The most obvious explanation for the RPN appropriation shortfall seems to be increased support of the fleet in high priority operations and crisis situations. During the 1994 fiscal year, over $15 million AT RPN dollars were executed for Fleet Peacekeeping and Humanitarian Support. The following is a list of the major expenditure of AT dollars:

• Bosnia	$ 380,590
• Haiti	$ 5,645,076
• Maritime Interdiction	$ 8,442,100
• Iraq	$ 724,434
• Total FY-94 AT	$15,192,200

In general, AT that is performed overseas is much more expensive than AT that is performed in the continental United States (CONUS). Overseas participation in AT has less

government berthing opportunities, therefore requires more per diem. In fiscal year 1993, 177,867 AT mandays were executed in out of CONUS operations at a cost of $24.9 million. In Fiscal Year 1994, 236,421 AT mandays were executed in out of CONUS operations was at a cost of $33.1 million, an increase of 33 percent.

The second contributing factor to the RPN appropriation shortfall was the failure to draw down the force end strength by the required 20,000 personnel. The reduction of the Naval Reserve Force by 15 percent proved to be a task that was more difficult to manage than was anticipated. The plan was to take as much of the drawdown as possible through normal attrition. A comprehensive monthly plan was developed to efficiently meet the required end strength reduction by utilizing monthly goals. This proved to be an effective plan for the enlisted drawdown, unfortunately it was ineffective for the higher paying officer ranks. The combination of the need to retain experienced officers and the lack of anticipated officer attrition contributed to the failure to meet the required end strength. Although additional steps were taken to facilitate the officer drawdown, these steps were taken too late to meet the reduction goals (Dalton 1994).

A major flaw of the original drawdown strategy was its passiveness; it allowed the attrition of personnel to dictate its success or failure. It lacked hard and precise milestone numbers, and failed to have alternative plans that were incrementally more severe. The plan compounded all other factors that contributed to the RPN appropriation shortfall, by keeping more personnel on the payroll than were originally budgeted. For fear of affecting a few reservists, a plan that lacked "bite" was implemented, which resulted in doing harm to many SELRES and still failed to bring the Naval Reserve to the required end strength.

E. THE NEED FOR A RPN MANYEAR RATE COSTING MODEL

Regardless of the numerous explanations that can be given to explain the RPN appropriation shortfall of 1994, an obvious problem appears to be the lack of flexibility of the budgeting and tracking system. The present system works in a non-dynamic environment as if timeliness is not a factor. As the environment changes, the present system is unable to adjust to the changes in a timely manner. As we shall see, the budgeting system in use is designed to function in ideal conditions and is not conducive to rapid changes that occur in the real world.

The present system is a form of baseline budgeting that uses last year's actual costs plus a percentage factor to establish manyear average (MYA) rates for different activities performed. One set of rates are established for officers and one set for enlisted personnel. These rates are established for the entire fiscal year and do not fluctuate if there are changes in the environment. For example, in developing a MYA rate for pay and allowances for an officer performing AT, a linear program model is created using average inputs for the "average officer".

Example:

Officer AT pay
and allowance rate = Basic Pay + FICA + RPA + BAQ + Incentive Pay + Special pay
(RPN Budget 1994)

Employing this formula as a budgeting tool could over or under cost the actual cost of the officer performing AT. This linear program model is used to budget any officer regardless of rank. Also, it is established for the entire fiscal year and cannot be changed until the next budget submission. By definition, this system of linear formulas to establish rates for different activities would be sufficient if future years were guaranteed to behave exactly the same as the past.

Unfortunately, in this extremely dynamic world it is impossible to predict costs for the entire year.

The strategic plan for RPN budgeting is to develop a cost model that can be programmed to reflect our rapidly changing environment. To make this RPN Manyear Rate Costing Model a more powerful budgeting tool, it must be directly linked to a strict end strength plan. This would allow planners to budget more accurately, with a model that reflects the real world and a pre-established end strength.

This RPN Manyear Rate Costing Model would be required to perform rapid sensitivity analysis to assist the budgeting office in dealing with fluctuations and drawdowns. This RPN Manyear Rate Costing Model would need to react to changes in pay scale, inflation, or price variations. Also, there is a need to have a model that breaks costs down by individual rank. This would allow for more accurate cost estimates, as opposed to lumping the cost models into two large categories of enlisted and officer MYA rates. The model must also be conducive to tracing costs to individual outputs and activities. It would also be useful if the RPN Manyear Rate Costing Model was available for both budgeting and non-budgeting personnel to perform "what if" scenarios without effecting the master model.

IV. RPN MANYEAR RATE ACTIVITY-BASED COSTING MODEL

A. ACTIVITY-BASED COSTING

The concept of activity-based costing is not a new concept. Its origins can be traced to the beginning of the twentieth century. Activity-based costing simply traces the activity costs to their causes and identifies those activities with specific outputs. Some have agreed that activity-based costing is simply doing cost accounting correctly. The goal is to design an accounting system that accurately matches the flow of resources within a production process (Euske 1991).

> In theory, activity-based costing allows managers to figure out the actual cost of making a particular product and servicing particular customers while spotlighting those unduly expensive activities that need to be pared back through business process re-engineering (Betts 1994).

To implement activity-based costing, involvement of a wide spectrum of specialty fields is required. For example, specialists from finance, operations, marketing, and management information systems may be required to collect data, prepare activity flows, and install systems to process information-intensive data. The reason for a wide spectrum of specialty fields are two fold. The first, for a successful activity-based costing system, it is essential to have expert information and data. The second, to get management buy-in, all participating parties must feel they were involved from the beginning and are stakeholders in the system (Betts 1994).

For organizations in the service sector, additional challenges must be faced. Product identification may be more difficult, because there is no warehouse of inventory to check for products produced. Also, white-collar workers must start thinking in terms of process flows, such as those that are normally linked to a factory floor. Although getting white-

collar workers to think in terms of process or activity flows may be difficult, this may be the greatest benefit of activity-based costing.

Activity-based costing provides hard data for evaluation of which activities or processes are in need of re-engineering. Essentially, activity-based costing allows companies and organizations to have clearer understanding of unit costs and performance. It is predicted by management theorists, such as Peter F. Drucker, that within a decade activity-based costing will become the norm in corporate America (Betts 1994).

B. THE ACTIVITY-BASED COSTING MODEL FOR RPN

1. Introduction

This section discusses the RPN Manyear Rate Activity-Based Costing Model that was developed using activity analysis to map operational and financial flows of the Naval Reserve's RPN appropriation. The analysis is presented by utilizing a nine step process. The model is presented using Fiscal Year 1994 data, and presents scenarios using estimated data for Fiscal Years 1995-1997.

The steps used to conduct the activity-based costing analysis consists of the following:

- Step One - Output Identification
- Step Two - Activity Identification
- Step Three - Resource Identification
- Step Four - Link Outputs to Activities to Resources
- Step Five - Data Collection
- Step Six - Model Construction
- Step Seven - Model Verification
- Step Eight - Model Validation

- Step Nine - Interpret the RPN Manyear Rate Costing Model

The software used to develop and operate the model is called NetProphet II, developed by Sapling Corporation. This software package was chosen because it provided strategic decision support, identified driver costs, identified activity costs to help management improve efficiency and effectiveness, and served as a fast and flexible budgeting tool.

In developing the model, a new view of the Naval Reserve was required. It was essential to think from the bottom to the top, to first decide the output, then activities, and finally resources. The difficulty arose in determining the output in an organization that does not produce products. Once the output or demand was established, the processes became more refined in terms of units measured. To properly allocate cost, a separate model was developed for each enlisted and officer rank. By separating each rank, costs could be traced to specific activities within a specific rank. Figure 4-1 is a schematic of a single rank within the entire model.

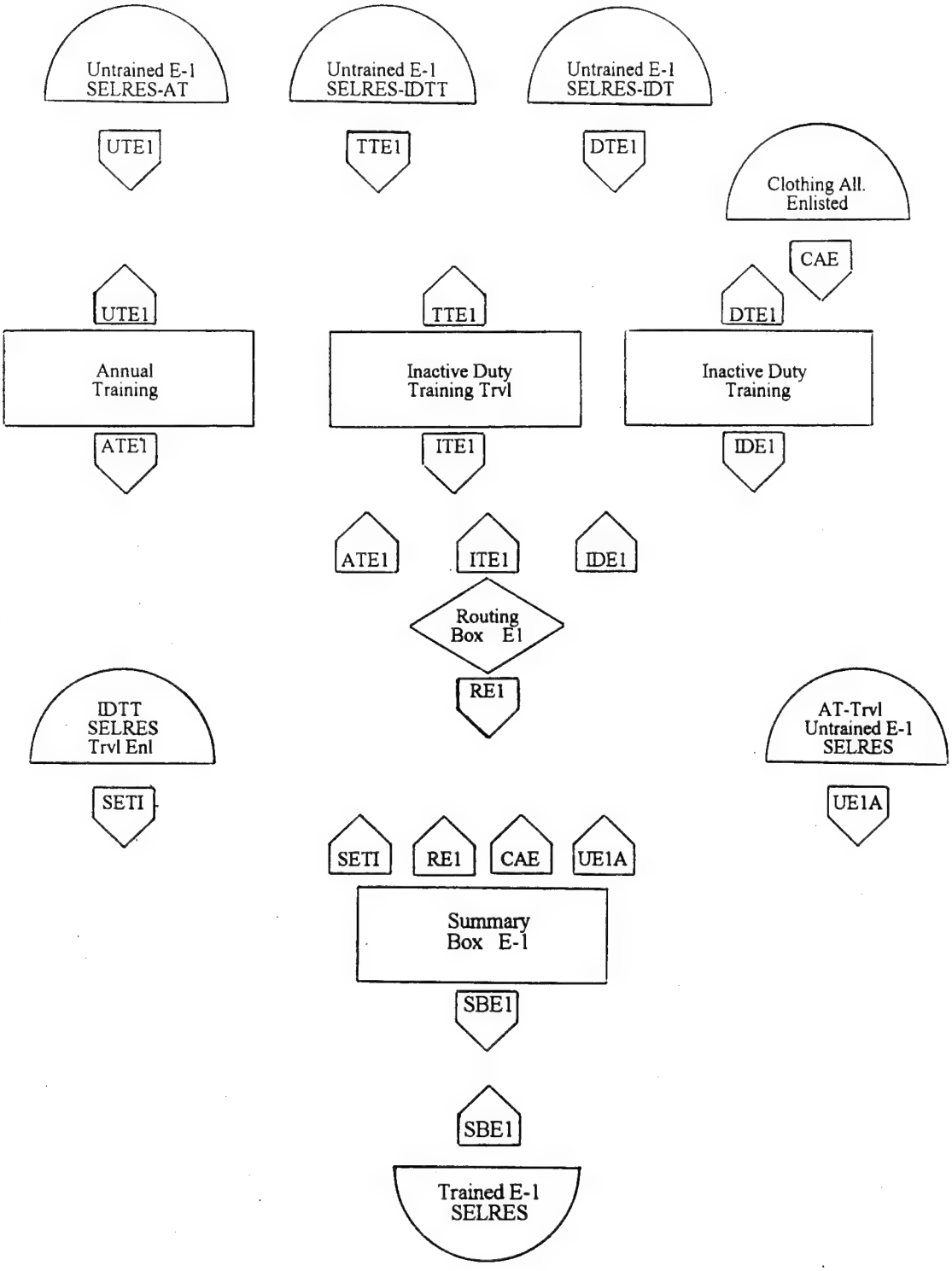
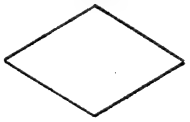


Figure 4-1 Schematic of E-1 Activity Flows

The following list is a description of the codes use on Figure 4-1. To reduce clutter and confusion, outputs, activities, and resources are connected by house shaped symbols the modeling software calls links. An additional diamond shaped symbol is used, called a routing box, to set the policy on the utilization of certain activities.

	CODE	DESCRIPTION
OUTPUT: 	TSE1	Trained E-1 SELRES Performing Annual Training Requirements
PROCESS BOXES: 	SBE1	Summary Box E-1 SELRES
	ATE1	Annual Training of E-1 SELRES
	IDE1	Inactive Duty Training of E-1 SELRES
	ITE1	Inactive Duty Training Travel of E-1 SELRES
RESOURCES: 	UTE1	Untrained E-1 SELRES performing Annual Training
	DTE1	Untrained E-1 SELRES performing Inactive Duty Training
	TTE1	Untrained E-1 SELRES performing Inactive Duty Training Travel
	CAE	Enlisted Clothing Allowance
	SETI	Travel For Enlisted SELRES performing Inactive Duty Training Away From Reserve Center
	UE1A	Travel For E-1 SELRES performing Annual Training
ROUTING BOX: 	RE1	Policy Ratio Established For Performing AT, IDT, and IDTT

2. Output Identification(Step One)

Outputs or demands are the primary cost objects that begin the chain of activities and consumption of resources in the project area (Sapling 1994). The objective of the Naval Reserve is to supply trained SELRES to the active component in time of war or national emergency. The RPN appropriation is used to pay these SELRES for training. Therefore, the output for this model was narrowed down to Trained SELRES Performing Annual Training Requirements. The reason that Trained SELRES Performing Annual Training Requirements was chosen is because this is the final product produced. This output matched what the Naval Reserve Headquarters in New Orleans defines as their objective.

Presently, a linear program model is used to establish one manyear rate for officers and one for enlisted. These rates are then used RPN budget submission. Utilizing this method creates a situation that makes tracing costs an impossibility. The RPN Manyear Rate Activity-Based Costing Model creates a separate model for each rank, with the output for each rank being Trained SELRES Performing Annual Training Requirements. This allows an analyst to trace cost directly to an activity within a specific rank.

Once the output was narrowly defined it was then necessary to trace the activities needed to produce the product.

3. Activity Identification(Step Two)

Activities were identified by what was necessary to produce a trained reservist. The definition of a trained reservist was narrowed to a SELRES that performed 62 drills annually. Each reservist is required to perform Annual Training (AT) and Inactive Duty Training (IDT) and/or Inactive Duty Training Travel (IDTT).

AT was defined as an activity in which the SELRES performs 14 days of training away from the reserve center and

receives credit for 14 drill periods. AT is designed to enable the SELRES to train with the ship or unit they will mobilize with in time of war or national emergency. In addition to regular pay, a reservist will receive funds for travel, lodging (BAQ), and per diem.

IDT is defined as an activity in which the SELRES performs 2 days of training at the reserve center and receives credit for 4 drill periods. An IDT usually takes place once a month or 3 times a quarter. An IDTT is 3 consecutive IDT's that require travel away from the reserve center to perform training. An IDTT was defined as a 6 day training period, in which the reservist receives credit for 12 drill periods.

The model requires each SELRES to perform 1 AT, 1 IDTT, and 9 IDT's. To ensure this policy was strictly enforced within the model, these activities were filtered through a routing box. This routing box sets the policy ratio for these activities. AT received a ratio of 0.2258 (14 drills/62 drills), IDTT received a ratio of 0.1936 (12/62), and IDT received a ratio of 0.5806 (36/62). To convert the units of output to units of input, this model uses a conversion tool called factors. A factor of 62 was used to convert units of drills to units of SELRES. This factor signifies that 62 drills are required to produce one trained SELRES. The total number of drills is divided by 62 before entering the summary box. A summary box is a process box that groups all the resources and activities needed to produce the required demand.

Next, resources which were demanded by these three activities were identified.

4. Resources Identification(Step Three)

At the top of the RPN Manyear Rate Activity-Based Costing Model are the resources. Resources can be of two varieties, fixed and variable. Since the RPN appropriation varies directly with the volume of output it uses, all resources are

variable (Figure 4-1). If the demand for Trained SELRES is zero, the utilization of all resources will be zero. Each resource must be consumed by one or more activities.

The three major resources, AT, IDT, and IDTT, provide for basic pay, FICA, RPA, special pay, incentive pay, and, for enlisted personnel only, subsistence. With the exception of subsistence, all of the resource inputs were factors of basic pay. Inputs for the three resources were determined by using multipliers. Multipliers are variables that represent a set of values that could fluctuate over time periods. So by simply inputting the pay rate for each rank, multipliers allowed the model to determine the various input amounts in each resource. Multipliers were also used to determine these rates over several time periods based on changes in pay rates and inflation.

The clothing allowance is also a variable resource that is directly related to the output. Unlike the previous resources, AT, IDT, and IDTT, clothing allowance did not feed an activity. Clothing allowance went directly to the summary box and has a factor of one (Figure 4-1).

The final two variable resources, AT travel and IDTT travel, were dependent on the amount of travel. The AT travel resource provides for travel, lodging (BAQ), and per diem. The IDTT travel resource set one single rate for all travel expenses. Like clothing allowance, these resources were directly linked to the summary box and have a factor of one. This factor was based on the assumption that each SELRES performed each type of travel once per year.

5. Link Outputs To Activities To Resources (Step Four)

Once all outputs, activities, and resources were properly defined, a schematic was developed to represent the operational flow. This operational flow schematic lead to the generation of the financial flow. The outputs, activities, and resources were interconnected by symbols called links. As

stated earlier, the purposes of these "house shaped" symbols are to indicate a continued flow of operations and to reduce cluster on a schematic (Figure 4-1). Links were also used to share common resources. For example, in Figure 4-1, clothing allowance for enlisted personnel is a common resource that was utilized by all enlisted outputs.

The importance of developing a logical and complete operational flow schematic cannot be underestimated. Constructing an operational flow of the RPN appropriation helped to develop and reinforce the author's understanding of the organization. This schematic also served as a communications tool to explain operational and financial flows. An important benefit of the schematic is its usefulness in identifying data collection requirements. Once the operational flow schematic was completed, data collection was necessary to develop the financial flows.

6. Data Collection (Step Five)

The fifth step was the task of data collection. Using the schematic as a guide in the collection of data greatly narrowed the scope of data collection. This facilitated the search for specific data that was required for the financial flows.

Most of the required financial data was supplied from the RPN Budget Office at the Naval Reserve Headquarters in New Orleans. The remaining data was acquired from the N959C1 in the office of the Director, Naval Reserve. Data was in the form of historical financial data and future estimates.

The model required a specific demand volume for each demand symbol. Using historical data and future estimates, an end strength for each rank (demand) was established. These demands (Trained SELRES) were the cost objects that generated the chain of activities in the portion of the RPN appropriation that we examined. The end strength selected for each rank specified the volume of demand for the time period

of the model.

The next step in data collection was collecting financial data. Financial data can refer to both costs and/or revenues. In this case there were no revenues, therefore all financial data was in terms of costs. Data was collected to determine full unit costs per drill, clothing allowance costs, and direct travel costs. Unit costs per drill for each rank consisted of basic pay, FICA, RPA, incentive pay, special pay, and subsistence. All of these costs were factors of basic pay for each specific rank. Two clothing rates were determined, one for officers and one for enlisted personnel. AT travel rates varied by rank, because it included a BAQ rate. Two rates were determined for IDTT travel, one for officers and one for enlisted (Figure 4-1).

The next task in data collection was determining the necessary conversion factors. As stated earlier in this section, a trained SELRES was defined as a reservist completing 62 drills annually. Therefore a factor of 62 was selected for the output of drills as they exited the routing box (Figure 4-1) and converted into SELRES as they entered the summary box. All other resources entering the summary box had a constant factor of one.

Once all the specific financial data was collected, it was time to construct the model using activity-based costing software.

7. Model Construction(Step Six)

Step six involved transferring the paper-based schematic and data collected to the computer-based model. The first step in constructing any activity-based costing model is to decide on some model descriptors and tables. For this model, the model descriptors and tables are known as the preliminary data. The most basic descriptor was to decide on a title for the model, which is The RPN Manyear Rate Activity-Based Costing Model.

The next step was to decide the time intervals for the model. An annual period was chosen to coincide with the budget submission. Units of measure throughout the model were defined as drills, allowances, or travel that were converted, using factors, to produce the final product, Trained SELRES.

To facilitate in analyzing and tracing costs throughout the model, financial categories were utilized. These financial categories are similar to a chart of accounts and are used to identify cost pools. Once these financial categories were established, all costs throughout the model were charged to these accounts. These categories were then used to create totals and subtotals on reports generated by the model. The following is a list of financial categories used in the model.

FINANCIAL CATEGORY NUMBER	NAME
110	Basic Pay
111	FICA
112	RPA
113	BAS
114	BAQ
115	Special Pay
116	Incentive Pay
117	Transportation
118	Per Diem
119	Subsistence
120	Clothing Allowance

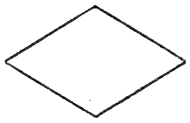
As stated earlier, the model utilizes a tool called multipliers to provide flexibility to the model. Multipliers are variables that represent a set of values that could fluctuate over time periods. Multipliers were used as substitutes for data values for the four fiscal years analyzed. All multipliers used in this model were factors of the basic pay scale used for active duty personnel.

Multipliers are valuable when performing sensitivity analysis and developing alternative scenarios. The following is a list of multipliers used in the model.

MULTIPLIER ID	NAME
01	Annual Pay Raise Rate
02	Annual Inflation rate
03	Basic Pay Rate - AT
04	Basic Pay Rate - IDT
05	Basic Pay Rate - IDTT
06	FICA Rate
07	RPA Rate
08	Special Pay Rate
09	Incentive Pay Rate

Once all the preliminary data was entered, entering the schematic symbols was the next step. The basic symbols for the model are as follows:

SYMBOL	NAME	DESCRIPTION
	Resource Box	- This symbol represents a variable supply of a resource - Usually at the top of a schematic - Requires one output link and no entry links
	Process Box	- Can represent a fixed resource, a process or activity, or a summary of activities - Has one output link and

		may or may not have entry links
	Output Box	- Represents the demands or the final cost object - Located at the bottom of the schematic -Has no output link and only one input link
	Routing Box	- Sets the policy for resource or activity use - Policy can be set by ratio, priority, or normality
 	Links	- Used to reduce clutter or to connect symbols off page - Used to share resources - Used to indicate a continued flow of operations

Each box required a unique identifier, maximum four characters, and a name that described that particular box, maximum 30 characters. Each box also required the units of output and applicable data, such as volume, factors, capacity, and financial. Once the model was completely transferred from paper to software, it was then necessary to verify the model.

8. Model Verification(Step Seven)

Verifying the model is a process in which the software checks that the boxes and links flow in a logical manner. It does not ensure that the model is accurate, simply logically consistent. The software will not allow working with the model

until it has been verified.

The software performs two types of verification, data and network. The data verification checks to see if each table that is referenced has properly specified number of units, cost, or multiplier number. The network verification takes a macro perspective by looking at the entire schematic. It checks to eliminate any dangling links and avoid any circular links. Once the schematic was transferred to the software, data entered, and model verified, it was time to validate the model.

9. Model Validation (Step Eight)

Model validation is an important step to ensure that the model accurately reflects the organization. The RPN Manyear Rate Activity-Based Costing Model developed in this thesis was validated using the Fiscal Year 1996/1997 Biennial Budget Estimates. Flows calculated by the software were compared to the actual BA1-A dollars expended during Fiscal Year 1994.

In constructing the model, step six, the budgeted end strength was used for the output volume of Trained SELRES. This output volume was chosen in order to properly validate the model. This model used only the data that was available to the RPN Budgeting Office during the budgeting phase for Fiscal Year 1994.

During the budgeting phase for Fiscal Year 1994, the RPN Budgeting office budgeted for 23,013 officers and 72,738 enlisted personnel at a budgeted cost of $566.517 million. The actual expenditure for BA1-A for Fiscal Year 1994 was $611.336 million, a difference of over $44.8 million. This inaccurate budget resulted in a 7.33 percent shortfall that was not fully realized until just prior to the end of the Fiscal Year.

The RPN Manyear Rate Activity-Based Costing Model used the same data for total output volume of officers and enlisted personnel. However, to more accurately capture costs, this model specifically listed output volume by individual ranks.

With all the same uncertainties experienced by the traditional budgeting system, this activity-based costing model was within 1 percent of the actual costs. The model developed a budget of $605.015 million, $6.3 million short of actual costs. This budget closely correlates with the actual execution of BA1-A funds, and therefore validates the model.

10. Interpret the RPN Manyear Rate Activity Based Costing Model (Step Nine)

After the validation step, the model was used to compare activity based information with the traditional costing method presently used and to obtain information that was not previously available. The most vital and powerful information provided by this model was the linking of operational and financial flows. The new information was used to identify specific high cost activities within specific outputs (ranks). The model identifies activities and resources contributing to output costs, activities that limit increased output, and costs of indirect training activities, such as transportation.

Operational information was provided by the model that was previously unavailable, yet important in tracing costs. Operational measures are now available to track resource consumption by activities and outputs. Not only can the costs of outputs be segregated into officers and enlisted consumption, but with the use of Tags[2], the consumption can be further subdivided by individual rank (Table 4-1). The model also provided operational measures for non-value added activities, such as transportation and clothing allowances.

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[2] Tags are identifiers utilized in the Net Prophet II software that allow the model creator to "tag" various portions of the model to facilitate in grouping related or relevant data.

Table 4-1
Enlisted and Officer Output Cost Tags

Tag 1 Enlisted

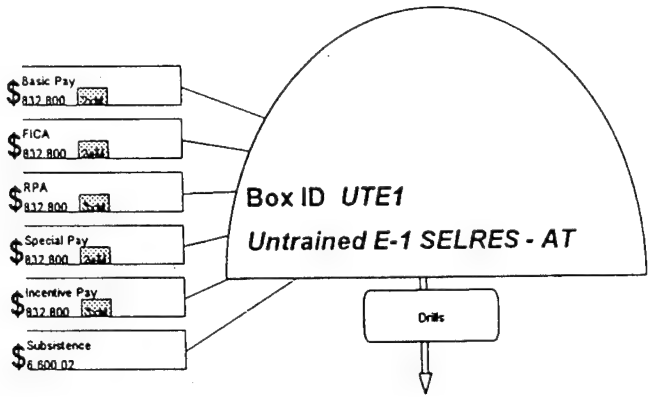
Box	Name	Output	Units	Cost
TSE1	Trained E-1 SELRES	2072	SELRES	7697775.00
TSE2	Trained E-2 SELRES	5722	SELRES	22694512.00
TSE3	Trained E-3 SELRES	10777	SELRES	45788980.00
TSE4	Trained E-4 SELRES	13537	SELRES	62817984.00
TSE5	Trained E-5 SELRES	19366	SELRES	100296384.00
TSE6	Trained E-6 SELRES	14090	SELRES	82349744.00
TSE7	Trained E-7 SELRES	5302	SELRES	34585736.00
TSE8	Trained E-8 SELRES	1332	SELRES	9858612.00
TSE9	Trained E-9 SELRES	540	SELRES	4632221.00
			Total	**370721948.00**

Tag 2 Officer

Box	Name	Output	Units	Cost
TSW1	Trained W-1/4 SELRES	539	SELRES	4853712.00
TSO1	Trained O-1 SELRES	872	SELRES	5348838.00
TSO2	Trained O-2 SELRES	3168	SELRES	25446680.00
TSO3	Trained O-3 SELRES	7936	SELRES	74139264.00
TSO4	Trained O-4 SELRES	6059	SELRES	66233552.00
TSO5	Trained O-5 SELRES	3437	SELRES	43478632.00
TSO6	Trained O-6 SELRES	956	SELRES	13898418.00
TSO7	Trained O-7 SELRES	31	SELRES	580278.13
TSO8	Trained O-8 SELRES	15	SELRES	313759.97
			Total	**234293134.09**

The new financial information provided was not only more accurate, but the model allows for any cost object to be costed, including activities and units of output. The model

enables financial data to be broken down to activity costs per unit. For example, the model costed AT drills of the most junior enlisted rank (E-1) to a unit cost of $40.1529. This unit cost included basic pay, FICA, RPA, special pay, incentive pay, and subsistence for one drill (Figure 4-2).



The model provides the opportunity to combine operational and financial information to develop measures and benchmarks that may be used to justify and prioritize process improvement and to re-engineer the training of SELRES. For example, operational decision makers and budget personnel from the Naval Reserve can gain a better understanding of the cost of key activities and decide if RPN funds are being used to get the most out of training and to prioritize training objectives.

C. ACTIVITY-BASED MANAGEMENT APPLICATIONS

The main objective of activity-based costing is to attempt to trace costs directly to activities and processes, thereby getting more useful information to the decision makers. Activity-based information is very useful for decision makers when formulating strategic planning and implementing tactical decisions. By implementing activity-based costing, budget decisions can be based on activities to be performed, and not on commands and departments.

Activity-based costing can improve the efficiency and effectiveness of output production because it clarifies actual activity costs. It allows management to focus on activities, rank product lines, re-engineer the process and introduce measurement schemes (Roper 1994). This section discusses several applications of the RPN Manyear Rate Activity-Based Costing Model.

1. Activity Based Budgeting

The model can greatly simplify the budgeting process. The budget must no longer be based on the changing cost of the static MYA rates, but on the changing costs of the different activities required to produce a trained SELRES. The model, with the use of pay raise, inflation, FICA, RPA, special pay, and incentive pay multipliers, can help make budgeting process much faster and more accurate. Each follow-on period only requires modifications to inputs that have changed from the master model. The model can be integrated with existing management information systems to automatically update model data as required. As demand for trained SELRES fluctuates, the model can easily and quickly recalculate the changes and display the results.

Another benefit of this model is its ability to reflect the rapid changes that exist within the Naval Reserve. During times of war or national emergency, the output and/or utilization of trained SELRES greatly increases, and the budgeting process requires a system that can quickly change with the dynamic times. By simply modifying the required drills, by changing the factor, and changing the volume of output, the model quickly recalculates and displays the results. Additionally, the model traces the use of funds by rank and activity. This activity based information will allow managers to make better informed decisions.

As previously discussed, there are seasonal changes in the training process within the Naval Reserve. For example,

historically there is a sharp increase in AT participation during the summer months for college students. By changing the model periodicity to months and changing the output volumes, the model is able to reflect the various output changes that occur during different periods of the year.

Activity-based costing changes how we think about the budgeting process. Decision makers and budgeting personnel are now given more flexibility in the budget process.

2. Target Costing

In this post-cold war period, the defense budget has been shrinking. Unfortunately, military obligations have not decreased. The need to develop realistic target cost has become much more important. In previous periods, budget offices were only required to produce "ballpark" figures. Now, with tight defense dollars, a "ballpark" figure could result in an Anti-deficiency Act violation.

During Fiscal Year 1994, the Naval Reserve was in a period of downsizing, but had problems reaching the targeted end strength. As previously discussed, this was a contributing factor to the RPN shortfall. This model would have enabled strategic planners to combine planning with cost reduction goals to give direct dollar value consequences of not reaching a goal. When dollar values are tied directly to decisions, a weighed value is then attached to that decision. This creates a situation of monetary accountability, which increases the likelihood of reaching desired goals.

The model allows decision makers to develop a target cost for a specified end strength or to maximize output based on a stated budget. Managers can get a quick and accurate budget estimate, by inputting a required output volume into the model. Also, if managers need to reduce output unit costs to produce trained SELRES, they have the option of changing activity priorities. For example, to reduce travel costs, the routing policy box (Figure 4-1) can be changed to cut IDTT and

increase IDT. This can be an important feature to stay beneath a budget ceiling at the end of a fiscal year.

3. Process Improvement

In addition to improving the accuracy of cost information provided by activity-based costing, the use of the model helps to turn hard numbers into a visual image when combined with the schematic. A visual image of the activities and their costs at each stage helps to identify performance measurement opportunities. This creates a basis for continuous process improvement.

By employing the model and activity-based costing analysis, waste and inefficiencies can be more easily identified. The model can pinpoint problem areas that can be addressed during process re-engineering efforts. Once these problems are identified, the multi-functional team can be called upon to discuss solutions and improve efficiency. During these times of decreasing defense dollars, it has become more important than ever to increase the efficient use of funds.

Continuous process improvement is not a concept that simply just happens. Future plans of the Naval Reserve must directly address the concept of process improvement to survive as an important entity of the armed forces. Striving to optimize short- term objectives must never be at the expense of long-term goals. Therefore, the Naval Reserve should aspire to formulate a strategy that has continuous process improvement as its cornerstone.

> It is easy to stay bound up in the tangled knots of the problems of today, becoming ever more and more efficient in them, but no company without a plan for the future will stay in business (Deming 1986).

4. Performing "What If?" Scenarios

One of the greatest benefits of the model is its ability to perform "what-if" scenarios. These scenarios can be used to determine the operational and financial impact of changes,

improvements, or influences to the Naval Reserve. This tool not only speeds up the budgeting process, but also helps managers make better decisions.

This ability to develop scenarios to test "what if" strategies is a unique benefit of the model and provides true activity based management capability. One form of scenario playing available on the model is sensitivity analysis. By utilizing multipliers, the model can display how changes in the environment will effect the RPN budget. For example, a change in inflation rate will effect transportation, subsistence, and clothing costs. A change in the basic pay rate will effect basic pay, BAS, BAQ, FICA, and RPA. By simply changing one multiplier, the model was able to calculate changes for all 18 outputs (ranks) in a matter of seconds.

Scenarios also provide the ability to identify constraining resources and their impact on the budget. The model can be used to analyze cost reductions and to create new financial and operating budgets. Additionally, by utilizing the model's "what if" function, the model can be used to evaluate process improvements.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The current Reserve Personnel Navy budget submission is based on Manyear Average (MYA) rates. This average cost figure does not accurately reflect the actual costs of employing SELRES. This MYA rate can, and historically has, underestimated the actual cost of "buying" SELRES. In Fiscal Year 1994 the MYA rate underestimated the actual cost by over 7 percent. The underestimation partially results from using only two MYA rates for enlisted personnel and officers.

This thesis presented the RPN Manyear Rate Activity-Based Costing Model which reflects a more accurate cost estimate for budget submission. The basis for the improved accuracy is that the model is a combination of eighteen submodels, one for each individual rank. The model provides more detailed costs which results in a more accurate estimate of expected costs.

In developing the model, several related questions had to be answered, "In the RPN Manyear Rate Activity-Based Costing model, what are the outputs and what activities must occur to produce those outputs?", "Can the model be used as a tool during the budgeting process?" and "Can the model assist decision makers in performing strategic planning?" Presented below are the answers to these questions.

1. Identify The Outputs And Activities Which Drive The Costs

In developing the activity-based model, it was first necessary to identify the outputs and the required activities to produce those outputs. Once the outputs were defined as Trained SELRES, a schematic was developed of the operational and financial flows. This provided a clear representation of the required resources and activities. This schematic proved to be valuable during data collection and model construction.

2. RPN Manyear Rate Activity Based Costing Model As A Budgeting Tool

Once the model was constructed, verified, and validated, it was concluded that the model could be used as an effective and accurate budgeting tool. The model was within 1 percent of the actual Fiscal Year 1994 costs, as opposed to the MYA rate budget, which underestimated the actual costs by over 7 percent.

The model is flexible and has the ability to quickly adjust to environmental conditions. By using tools, such as multipliers and factors from the activity-based costing software, the model is able to quickly recalculate unit and total costs. The model also provides the ability to produce reports that compare the original model to the newly revised model. The model provides a clear image of which activities are using resources and how much they are using. This gives managers the ability to justify the use of resources.

3. RPN Manyear Rate Activity Based Costing Model In Strategic Planning

One of the models most useful and unique benefits is its ability to play "what if" scenarios. This is ideal for both strategic and tactical planning. By playing these scenarios, decision makers and planners can perform sensitivity analysis on their strategic plans.

In strategy planning, decision makers must focus on several strategic factors in order to formulate and implement a successful plan. The model helps to address several of these strategic factors. One factor is awareness of the environment in which you operate. As stated earlier, the model is able to quickly reflect environmental conditions. Another factor is alternative uses for scarce resources. The model can assist budgeting personnel develop budgets that more accurately reflect true costs. This results in reducing the possibility of undercharging resource sponsors for "buying" SELRES, therefore preserving scarce resources.

The single most important strategic factor for any organization is establishing over-arching goals. Not only is it important to have long-range goals, but it is equally important to establish short-range goals that are consistent with the over-arching goals. Because the model is able to manage up to 14 time periods, short- and long-term RPN goals can be established. By utilizing the scenario tool, these strategic decisions can be tested to evaluate their effectiveness. For example, the model can be used to determine how budget cuts will impact long-range end strength plans.

B. APPLICATION RECOMMENDATIONS

COMNAVRESFOR should make the transition from its present accounting system to implementing the RPN Manyear Rate Activity-Based Costing Model. The model can be modified or further divided into subparts to more effectively trace costs. A decision must be made as to the relative benefits of the increased accuracy and the additional costs that will be incurred providing the increased accuracy.

There are several organizations in the Naval Reserve that can immediately benefit from implementing the model. The following organizations can use the model in different applications to benefit their specific needs.

1. COMNAVRESFOR RPN Budgeting Office

The model was developed and tailored to assist the RPN Budgeting Office in performing their budgetary functions. The model is a tool that will facilitate more accurate budgeting and better cost tracing. The model is also simple to use and can quickly be modified to reflect environmental changes.

2. COMNAVRESFOR

COMNAVRESFOR can use the model to perform several functions. As the principal advisor to the CNO on matters concerning the Naval Reserve, COMNAVRESFOR is responsible for establishing the overall strategy of the Naval Reserve. The model can be used in developing long-range end strength plans.

Also, the scenario capability of the model can be used to perform cost-benefit analysis.

3. COMNAVSURFRESFOR and COMNAVAIRESFOR Financial Management Departments

These Echelon III commanders could use the model to provide input to COMNAVRESFOR. Echelon III commanders can submit their respective RPN budget requirements to fulfill operational obligations. These budget requests could identify unit costs, activity costs, and total output costs.

Additionally, these commanders can submit reduced mobilization readiness conditions at specified levels of reduced funding. For example, inputting a 10 percent reduction in funding into the model demonstrates that readiness will be reduced by 15 percent throughout the force. The model can provide decision makers at the Echelon II level more detailed information for decision making.

C. FUTURE RESEARCH

Continued research is needed in RPN appropriation. To make the model more beneficial, full costing models are required in the AT, IDT, and IDTT activities. This would allow decision makers to have an even better indication of the cost of a SELRES. Each of the full costing models could be developed separately and merged with this model to produce a more complete model.

By developing full costing models for each of the three activities, all direct and indirect costs would be captured. This would produce a cost per unit of output that included virtually all of the relevant costs. Presently, the system averages important cost differences across outputs by failing to charge activities for their fair share. This distortion in activity costs, in many cases, encourages decision makers to choose inappropriate strategies (Shank and Govindarajan 1989).

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LIST OF ACRONYMS

ACNO: Assistant Chief of Naval Operations

ADT: Active Duty Training

AT: Annual Training

ATE1: Annual Training of E-1 SELRES

ATP: Additional Training Periods

BA: Budget Activity

BA1: Budget Activity 1

BA1-A: Budget Activity 1, Pay Group A

BA2: Budget Activity 2

BAQ: Basic Allowance for Quarters

BAS: Basic Allowance for Subsistence

CAE: Enlisted Clothing Allowance

CHNAVPERS: Chief of Naval Personnel

CNET: Chief of Naval Operations

CNO: Chief of Naval Operations

COMNAVAIRESFOR: Commander, Naval Air Reserve Force

COMNAVMEDCOM: Commander, Naval Medical Command

COMNAVMILPERSCOM: Commander, Naval Military Personnel Command

COMNAVRESFOR: Commander Naval Reserve Force

COMNAVSURFRESFOR: Commander, Naval Surface Reserve Force

CONUS: Continental United States

DCNO: Deputy Chief of Naval Operations

DMSO: Director of Major Staff Offices

DoD: Department of Defense

DoN: Department of the Navy

DTE1: Untrained E-1 SELRES performing Inactive Duty Training

FEMA: Federal Emergency Management Agency

FICA: Federal Insurance Contribution Act

FTS: Full Time Support

FY: Fiscal Year

IDE1: Inactive Duty Training of E-1 SELRES

IDT: Inactive Duty Training

IDTT: Inactive Duty Training Travel

IMA: Individual Mobilization Augmentees

IRR: Individual Ready Reserve

ISIC: Immediate Superior IN Command

ITE1: Inactive Duty Training Travel of E-1 SELRES

MYA: Manyear Average

N095: Director, Naval Reserve

N82: Reserve Personnel, Navy Budget Office of Commander, Naval Reserve Force

NAMMOS: Naval Manpower Mobilization System

NAVCOMPT: Office of Comptroller, Navy

NRF: Naval Reserve Force

O&MNR: Operations and Maintenance Navy, Reserve

OPNAVINST: Instructions from the Office of the Chief of Naval Operations

PAO: Public Affairs Office

Pers-51: Assistant Chief of Naval Personnel for Total Force Programming and Manpower

Pers-9: The Chief of Naval Personnel

PSRC: Presidential Selected Reserve Call-up Authority

RE1: Policy Ratio Established For Performing AT, IDT, and IDTT

ROTC: Reserve Officer Training Corps

RPA: Retirement Pay Accrual

RPN: Reserve Personnel, Navy

SBE1: Summary Box E-1 SELRES

SECNAV: Secretary of the Navy

SELRES: Selected Reserve

SETI: Travel For Enlisted SELRES performing Inactive Duty Training Away From Reserve Center

SMD: Ship Manpower Document

SQMD: Squadron Manpower Document

TAR: Training and Administration of Reserves

TSE1: Trained E-1 SELRES Performing Annual Training Requirements

TTE1: Untrained E-1 SELRES performing Inactive Duty Training Travel

UE1A: Travel For E-1 SELRES performing Annual Training

USC: United States Code

UTE1: Untrained E-1 SELRES performing Annual Training

APPENDIX A. TOTAL RESOURCE RESULTS

'RPN Manyear Rate Activity-Based Costing Model'

Resource Boxes	Quantity	Units		Total
Cost				
UE1A Untrained E-1 SELRES - AT Tr	2072	SELRES TVL	V	1784096.97
UTE1 Untrained E-1 SELRES - AT	29007	Drills	V	1164722.90
TTE1 Untrained E-1 SELRES - IDTT	24871	Drills	V	998628.73
DTE1 Untrained E-1 SELRES - IDT	74586	Drills	V	2994854.68
UE2A Untrained E-2 SELRES - AT Tr	5722	SELRES TVL	V	4926931.87
UTE2 Untrained E-2 SELRES - AT	80106	Drills	V	3540833.22
DTE2 Untrained E-2 SELRES - IDT	205976	Drills	V	9104551.96
TTE2 Untrained E-2 SELRES - IDTT	68682	Drills	V	3035896.08
UE3A Untrained E-3 SELRES - AT Tr	10777	SELRES TVL	V	9361022.97
UTE3 Untrained E-3 SELRES - AT	150874	Drills	V	7338173.77
TTE3 Untrained E-3 SELRES - IDTT	129358	Drills	V	6291720.26
DTE3 Untrained E-3 SELRES - IDT	387942	Drills	V	18868662.3
UE4A Untrained E-4 SELRES - AT Tr	13537	SELRES TVL	V	11917596.7
UTE4 Untrained E-4 SELRES - AT	189513	Drills	V	10378820.3
TTE4 Untrained E-4 SELRES - IDTT	162487	Drills	V	8898758.27
DTE4 Untrained E-4 SELRES - IDT	487294	Drills	V	26687084.4
UE5A Untrained E-5 SELRES - AT Tr	19366	SELRES TVL	V	17537343.2
UTE5 Untrained E-5 SELRES - AT	271116	Drills	V	17092609.3
TTE5 Untrained E-5 SELRES - IDTT	232454	Drills	V	14655133.6
DTE5 Untrained E-5 SELRES - IDT	697122	Drills	V	43950264.1
UE6A Untrained E-6 SELRES - AT Tr	14090	SELRES TVL	V	13067283.0
UTE6 Untrained E-6 SELRES - AT	197254	Drills	V	14483967.7
TTE6 Untrained E-6 SELRES - IDTT	169125	Drills	V	12418482.7
DTE6 Untrained E-6 SELRES - IDT	507201	Drills	V	37242657.8
UE7A Untrained E-7 SELRES - AT Tr	5302	SELRES TVL	V	5010690.31
UTE7 Untrained E-7 SELRES - AT	74226	Drills	V	6241536.90
TTE7 Untrained E-7 SELRES - IDTT	63641	Drills	V	5351468.48
DTE7 Untrained E-7 SELRES - IDT	190857	Drills	V	16048877.6
UE8A Untrained E-8 SELRES - AT Tr	1332	SELRES TVL	V	1282686.65
UTE8 Untrained E-8 SELRES - AT	18647	Drills	V	1826781.52
TTE8 Untrained E-8 SELRES - IDTT	15988	Drills	V	1566275.09
DTE8 Untrained E-8 SELRES - IDT	47948	Drills	V	4697207.44
CAE Clothing Allowance Enlisted	72738	Allowance	V	8232486.86
SETI IDTT SELRES Tvl Enlisted	72738	SELRES TVL	V	18288514.8
UE9A Untrained E-9 SELRES - AT Tr	540	SELRES TVL	V	531500.11
UTE9 Untrained E-9 SELRES - AT	7560	Drills	V	881485.07
TTE9 Untrained E-9 SELRES - IDTT	6482	Drills	V	755781.74
DTE9 Untrained E-9 SELRES - IDT	19438	Drills	V	2266564.48
UW1A Untrained W-1/4 SELRES-AT Tv	539	SELRES TVL	V	708667.49
UTW1 Untrained W-1/4 SELRES - AT	7546	Drills	V	882752.14
TTW1 Untrained W-1/4 SELRES - IDT	6470	Drills	V	756868.09
DTW1 Untrained W-1/4 SELRES - IDT	19402	Drills	V	2269822.62
UO1A Untrained O-1 SELRES-AT Trvl	872	SELRES TVL	V	1095375.38
UTO1 Untrained O-1 SELRES - AT	12208	Drills	V	874365.79
TTO1 Untrained O-1 SELRES - IDTT	10467	Drills	V	749677.69
DTO1 Untrained O-1 SELRES - IDT	31390	Drills	V	2248258.83
UO2A Untrained O-2 SELRES-AT Trvl	3168	SELRES TVL	V	4056263.58
UTO2 Untrained O-2 SELRES - AT	44351	Drills	V	4517275.79
TTO2 Untrained O-2 SELRES - IDTT	38026	Drills	V	3873093.97
DTO2 Untrained O-2 SELRES - IDT	114039	Drills	V	11615281.3
UO3A Untrained O-3 SELRES-AT Trvl	7936	SELRES TVL	V	10468924.7
UTO3 Untrained O-3 SELRES - AT	111101	Drills	V	13593482.7
TTO3 Untrained O-3 SELRES - IDTT	95257	Drills	V	11654997.6
DTO3 Untrained O-3 SELRES - IDT	285674	Drills	V	34952951.7
UO4A Untrained O-4 SELRES - AT Tr	6059	SELRES TVL	V	8327931.30
UTO4 Untrained O-4 SELRES - AT	84824	Drills	V	12477067.5
TTO4 Untrained O-4 SELRES - IDTT	72727	Drills	V	10697787.8
DTO4 Untrained O-4 SELRES - IDT	218107	Drills	V	32082313.2

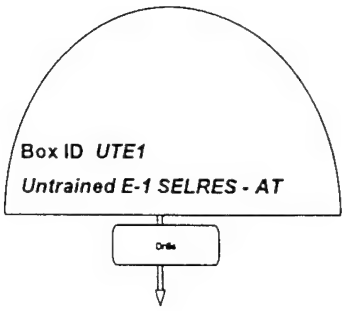
'RPN Manyear Rate Activity-Based Costing Model'

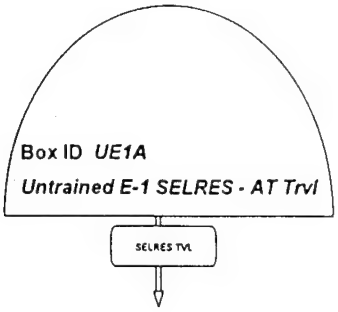
Resource	Boxes	Quantity	Units		Total
UO5A	Untrained O-5 SELRES - AT Tr	3437	SELRES TVL	V	4872277.27
UTO5	Untrained O-5 SELRES - AT	48117	Drills	V	8378085.60
TTO5	Untrained O-5 SELRES - IDTT	41255	Drills	V	7183336.77
DTO5	Untrained O-5 SELRES - IDT	123722	Drills	V	21542589.7
UO6A	Untrained O-6 SELRES - AT Tr	956	SELRES TVL	V	1368339.07
UTO6	Untrained O-6 SELRES - AT	13384	Drills	V	2734935.11
TTO6	Untrained O-6 SELRES - IDTT	11475	Drills	V	2344922.36
DTO6	Untrained O-6 SELRES - IDT	34413	Drills	V	7032344.64
UO7A	Untrained O-7 SELRES - AT Tr	31	SELRES TVL	V	45664.24
UTO7	Untrained O-7 SELRES - AT	434	Drills	V	117656.13
TTO7	Untrained O-7 SELRES - IDTT	372	Drills	V	100877.89
DTO7	Untrained O-7 SELRES - IDT	1116	Drills	V	302529.46
SOTI	IDTT SELRES Officer-Travel	23013	SELRES TVL	V	9456271.91
CAO	Clothing Allowance Officer	23013	Allowance	V	602940.62
UO8A	Untrained O-8 SELRES - AT Tr	15	SELRES TVL	V	22095.60
UTO8	Untrained O-8 SELRES - AT	210	Drills	V	64377.32
TTO8	Untrained O-8 SELRES - IDTT	180	Drills	V	55196.86
DTO8	Untrained O-8 SELRES - IDT	540	Drills	V	165533.55
Total Cost					605015087.

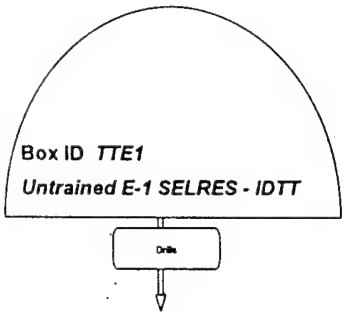
Total Model Summary

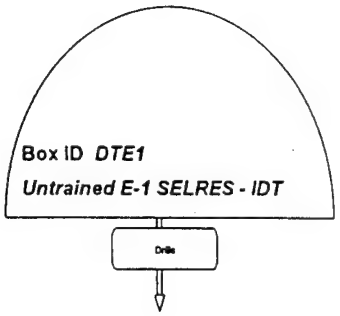
	Fixed	Variable	Total
Cost	0.00	605015083.54	605015083.54

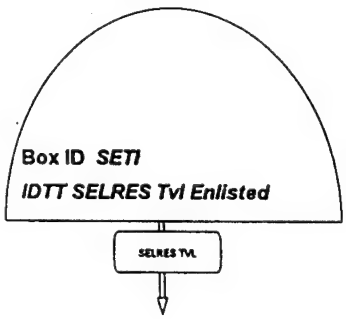
APPENDIX B. GRAPHICAL DEPICTION OF E-1 SUBMODEL

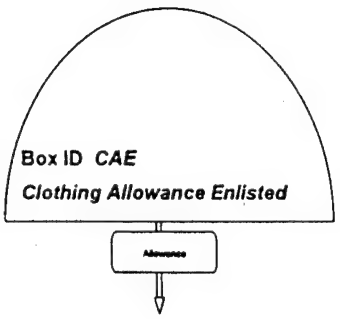


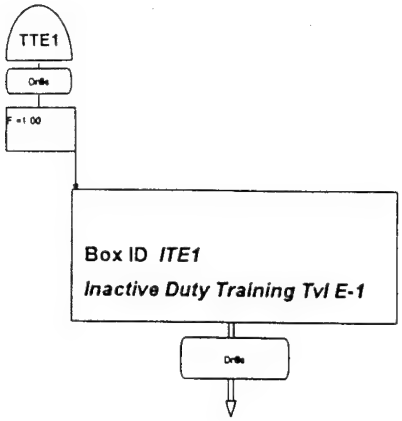








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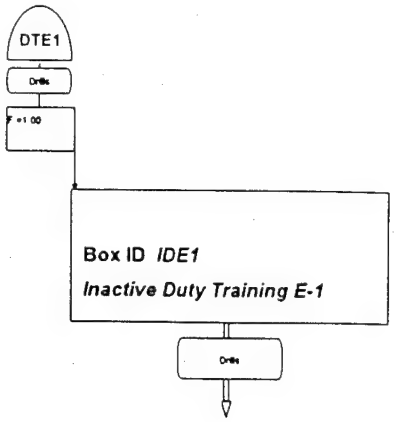
Inactive Duty Training Tvl E-1
Drills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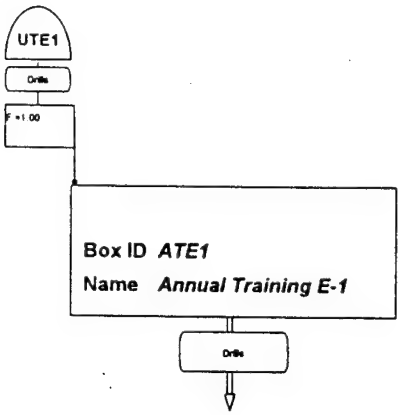
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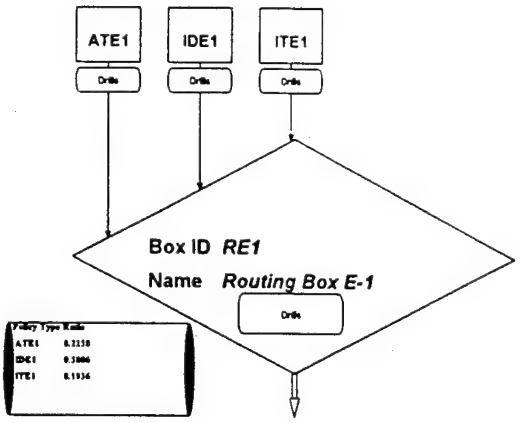
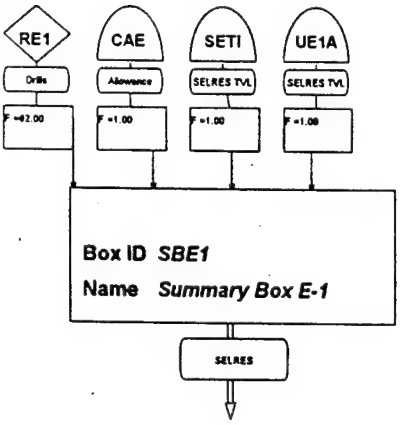
Name Annual Training E-1
Drills


ATE1
IDE1
ITE1
Drills
Box ID RE1
Name Routing Box E-1
Drills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CAE
SETI
UE1A
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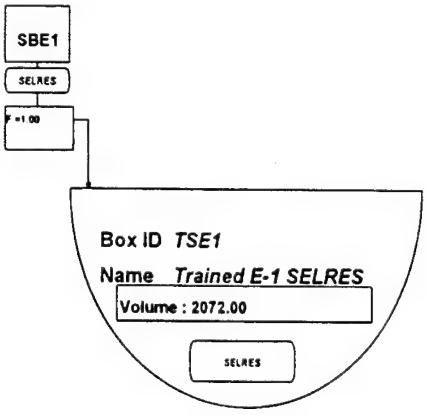
Name Summary Box E-1
SELRES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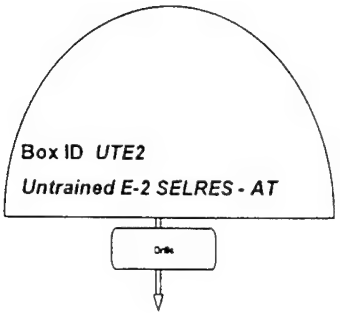
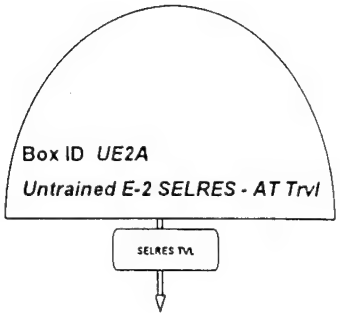
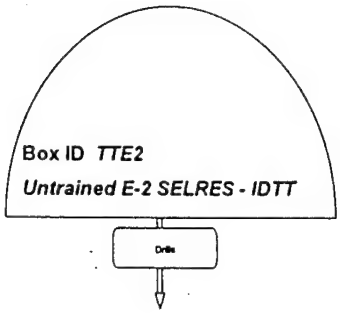
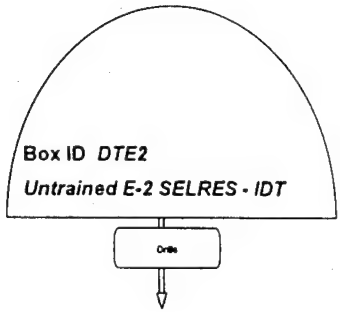
Volume : 2072.00
SELRES

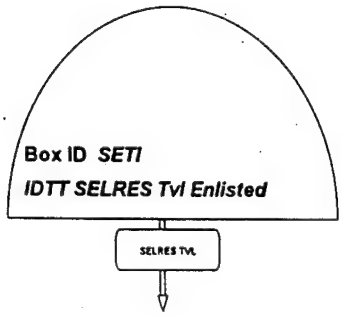
APPENDIX C. GRAPHICAL DEPICTION OF E-2 SUBMODEL

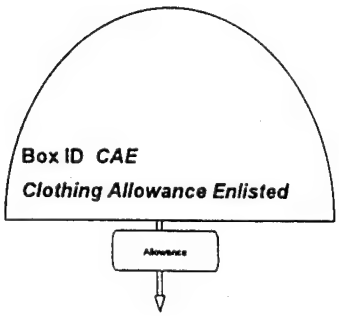


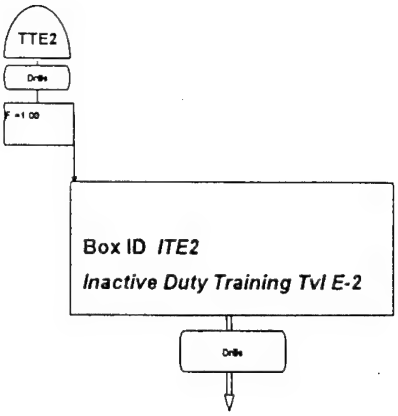








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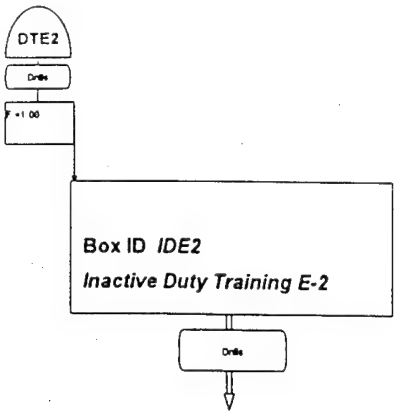
Drills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Inactive Duty Training E-2
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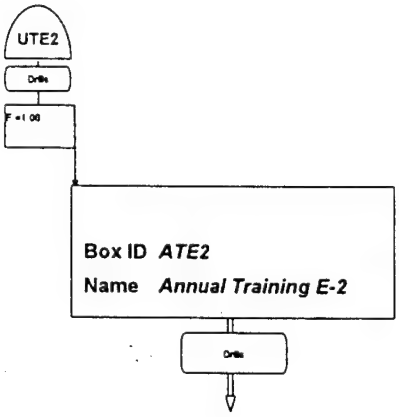
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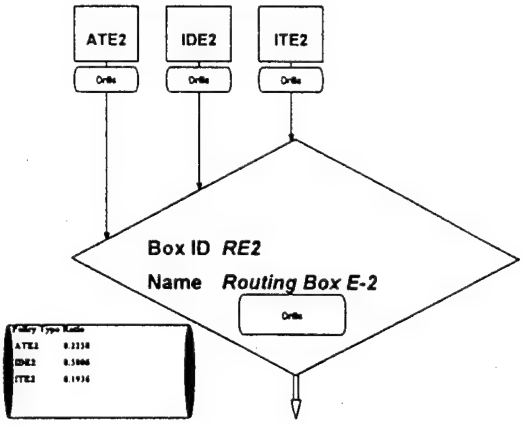
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IDE2
ITE2
Drills
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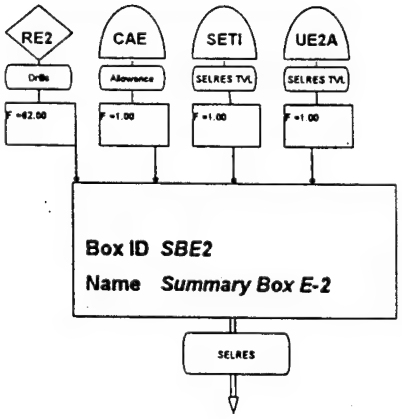
Name Routing Box E-2
Drills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SETI
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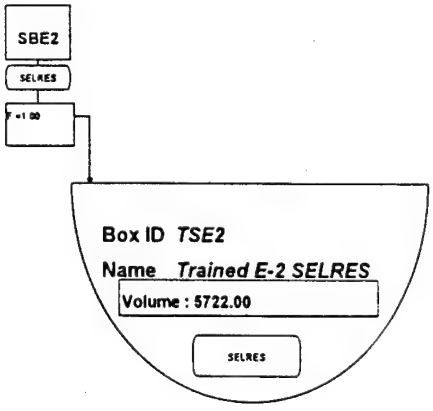
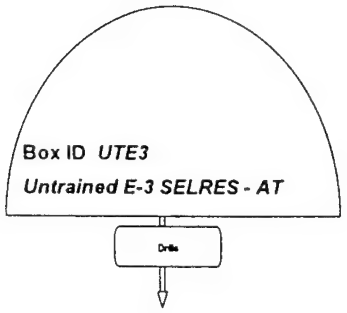
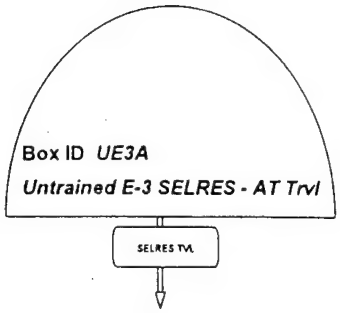
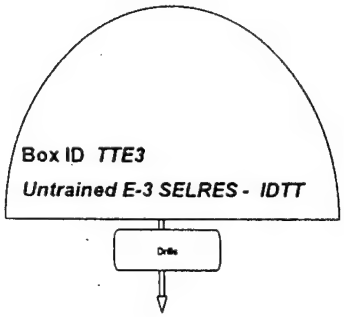
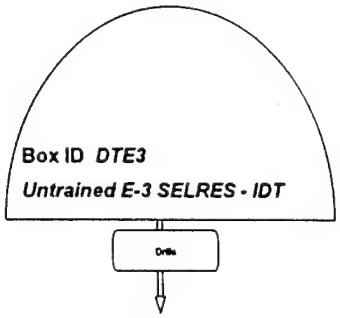

SBE2
SELRES
F =1.00
Box ID TSE2
Name Trained E-2 SELRES
Volume : 5722.00
SELRES

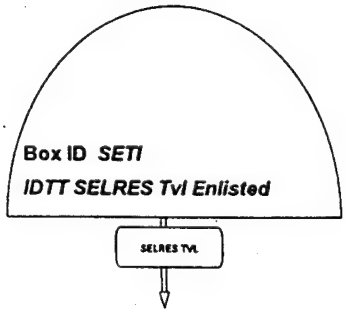
APPENDIX D. GRAPHICAL DEPICTION OF E-3 SUBMODEL

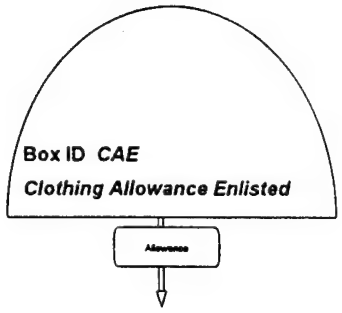


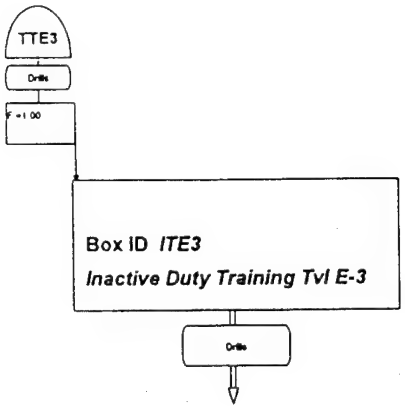


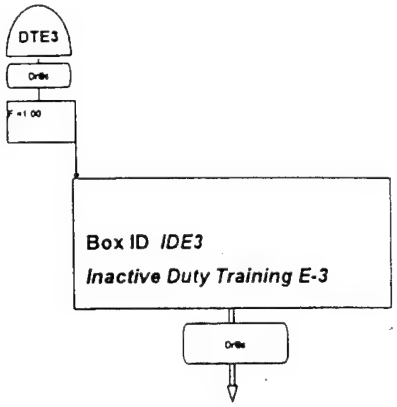


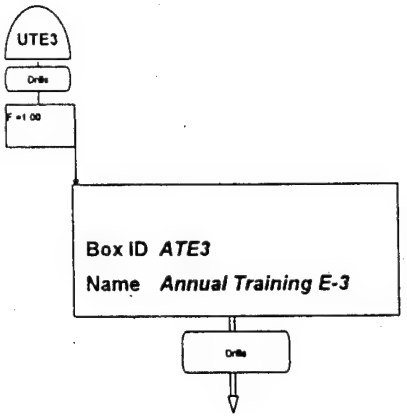


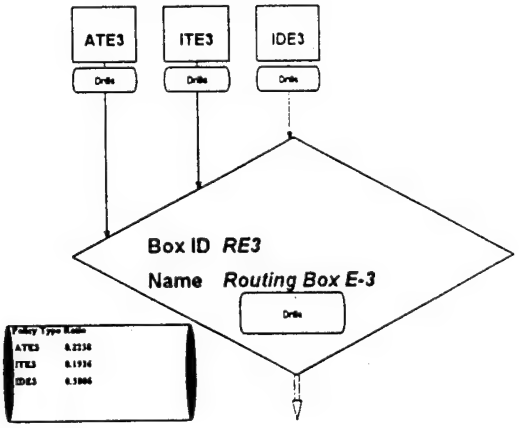


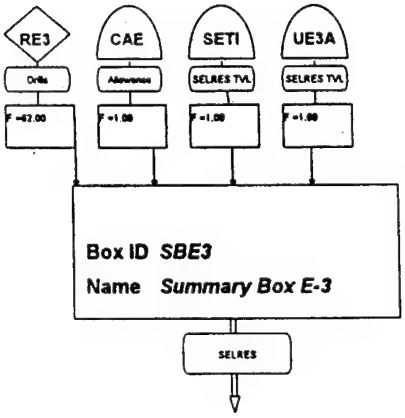


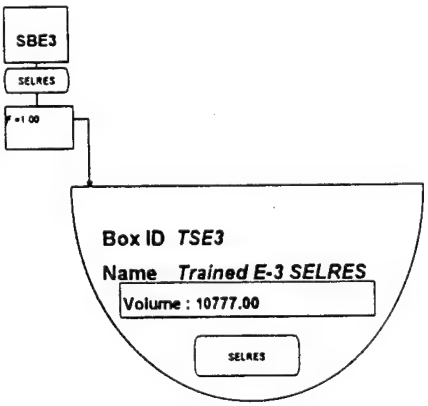

TTE3
Box ID ITE3
Inactive Duty Training Tvl E-3


DTE3
Box ID IDE3
Inactive Duty Training E-3

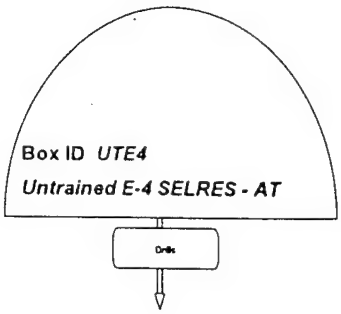

UTE3
Box ID ATE3
Name Annual Training E-3

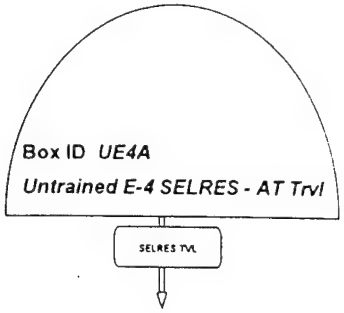

ATE3
ITE3
IDE3
Box ID RE3
Name Routing Box E-3

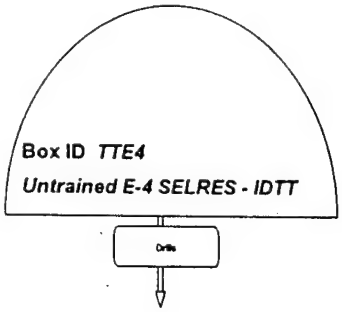

RE3
CAE
SETI
UE3A
Box ID SBE3
Name Summary Box E-3
SELRES

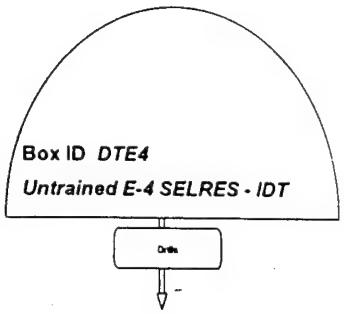

SBE3
SELRES
Box ID TSE3
Name Trained E-3 SELRES
Volume : 10777.00
SELRES

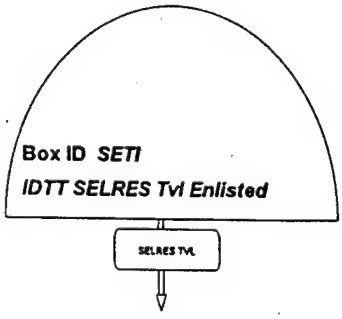
APPENDIX E. GRAPHICAL DEPICTION OF E-4 SUBMODEL

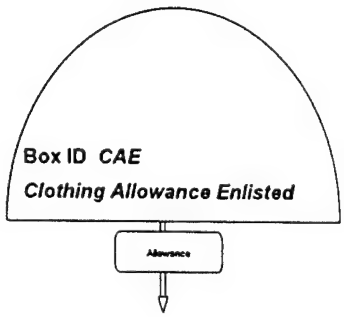


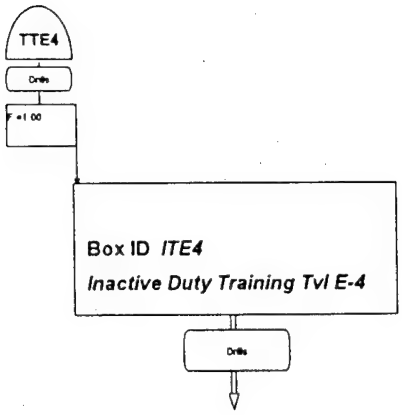


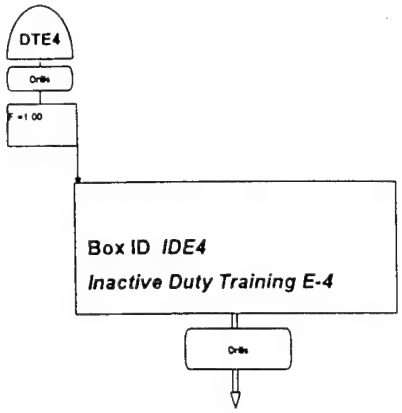


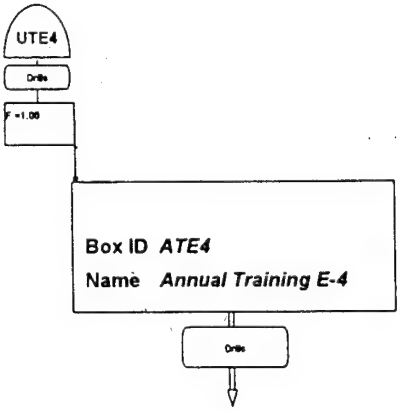


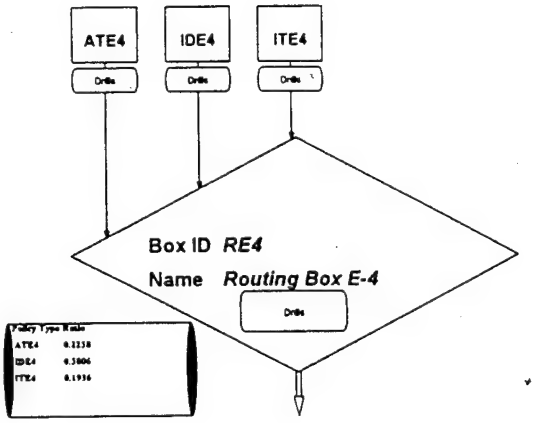


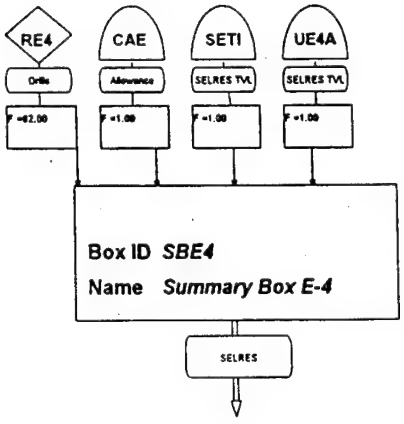


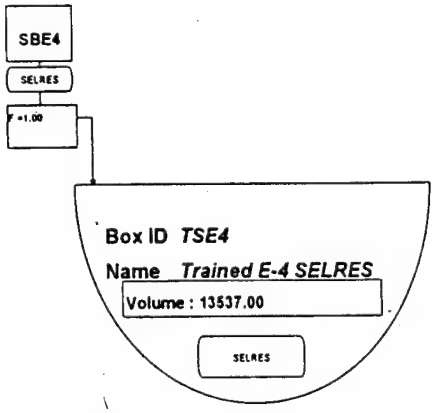

TTE4
Box ID ITE4
Inactive Duty Training Tvl E-4


DTE4
Box ID IDE4
Inactive Duty Training E-4

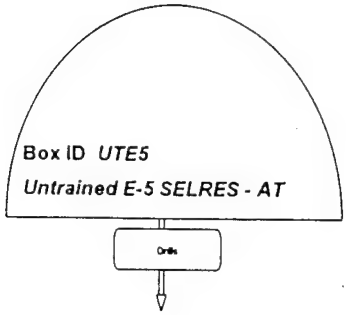

UTE4
Box ID ATE4
Name Annual Training E-4

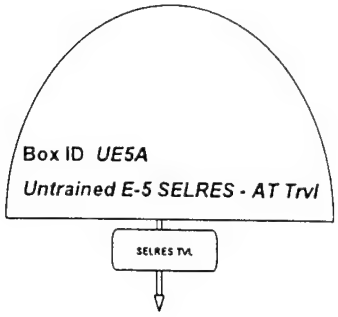

ATE4
IDE4
ITE4
Box ID RE4
Name Routing Box E-4

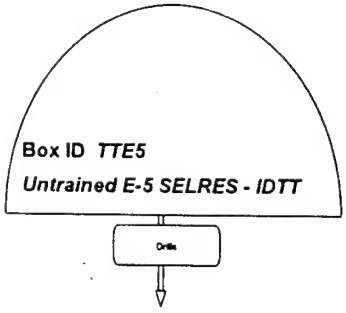

RE4
CAE
SETI
UE4A
Box ID SBE4
Name Summary Box E-4
SELRES

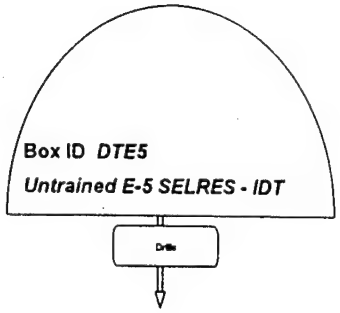

SBE4
SELRES
Box ID TSE4
Name Trained E-4 SELRES
Volume : 13537.00
SELRES

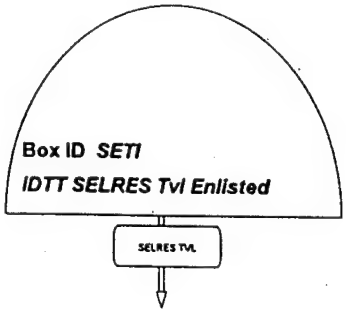
APPENDIX F. GRAPHICAL DEPICTION OF E-5 SUBMODEL

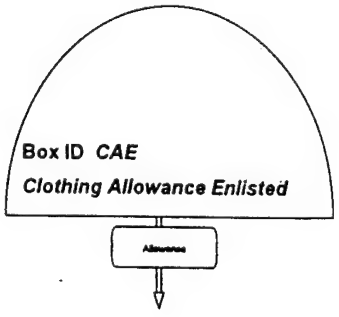


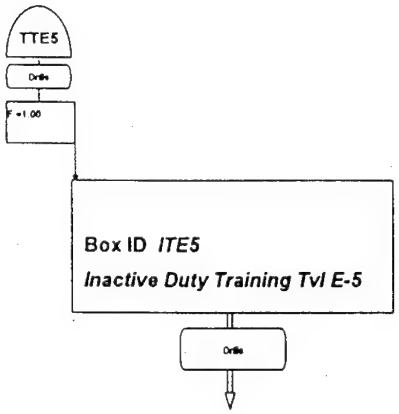


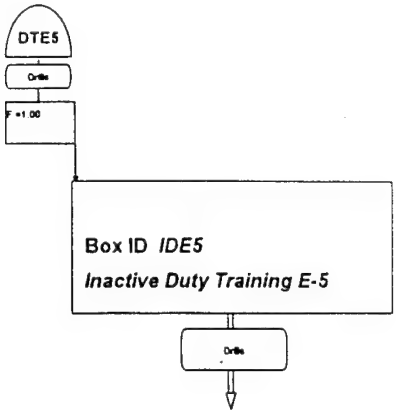


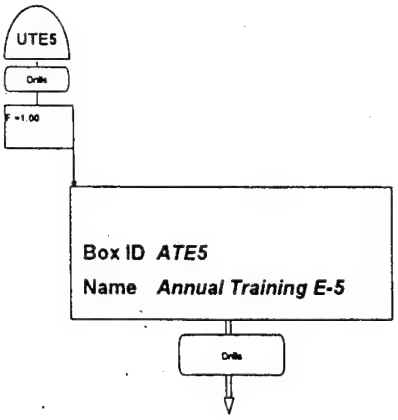


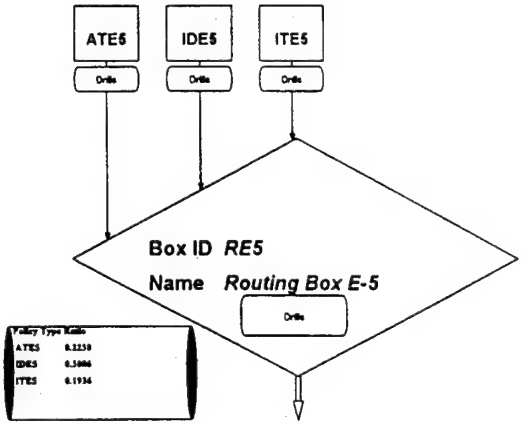


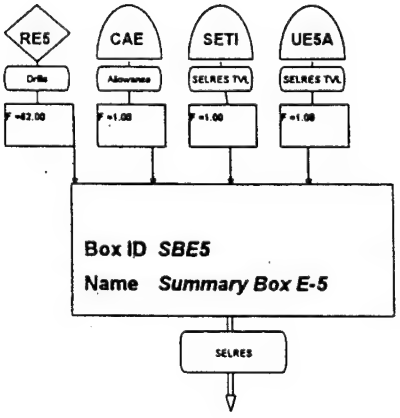


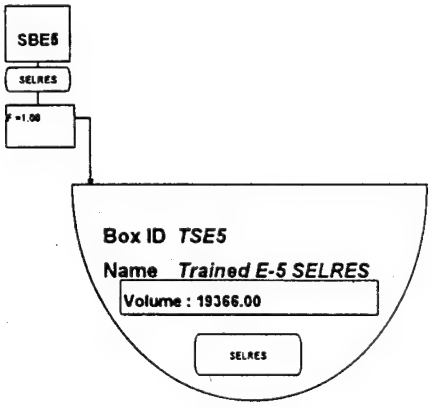

TTE5
Drills
F =1.00
Box ID ITE5
Inactive Duty Training Tvl E-5
Drills


DTE5
Drills
F =1.00
Box ID IDE5
Inactive Duty Training E-5
Drills

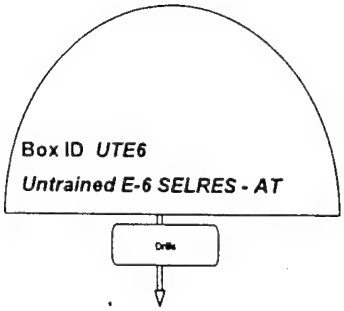

UTE5
Drills
F =1.00
Box ID ATE5
Name Annual Training E-5
Drills

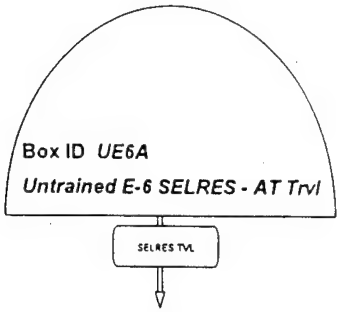

ATE5
IDE5
ITE5
Drills
Box ID RE5
Name Routing Box E-5
Drills

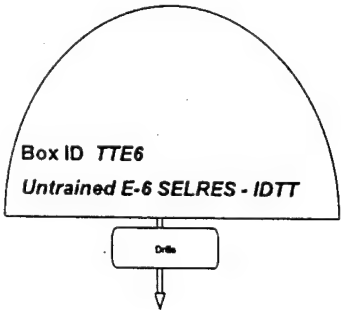

RE5
CAE
SETI
UE5A
Drills
Allowance
SELRES TVL
SELRES TVL
F =42.00
F =1.00
F =1.00
F =1.00
Box ID SBE5
Name Summary Box E-5
SELRES

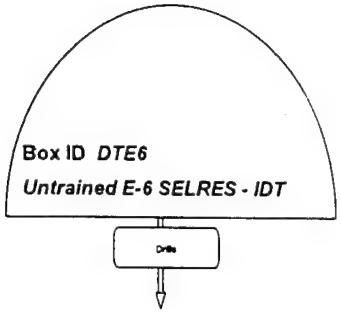

SBE5
SELRES
F =1.00
Box ID TSE5
Name Trained E-5 SELRES
Volume : 19366.00
SELRES

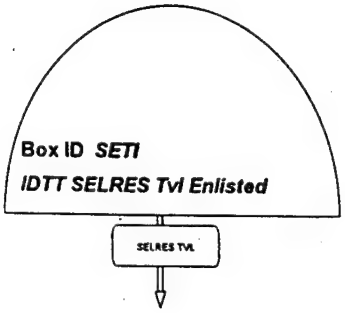
APPENDIX G. GRAPHICAL DEPICTION OF E-6 SUBMODEL

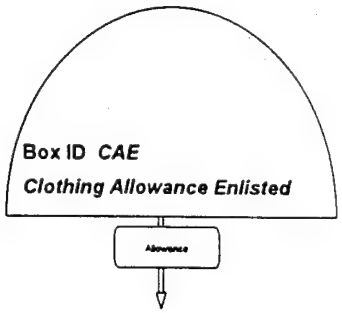


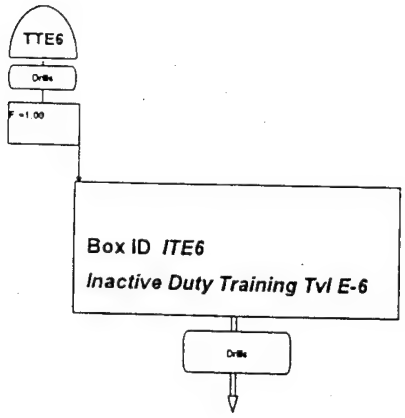


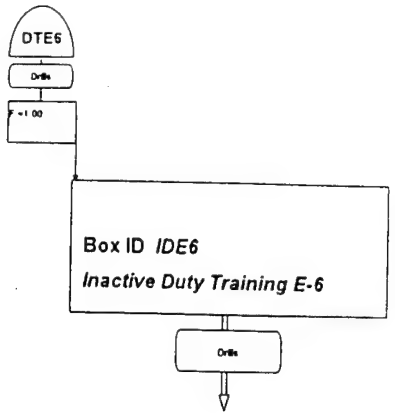


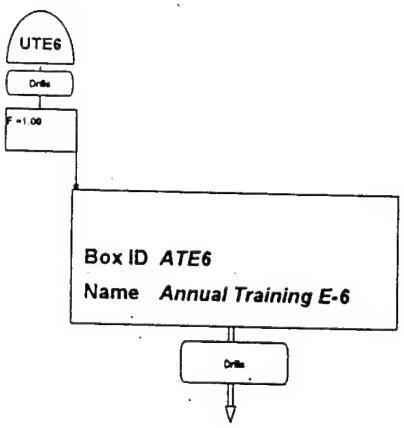


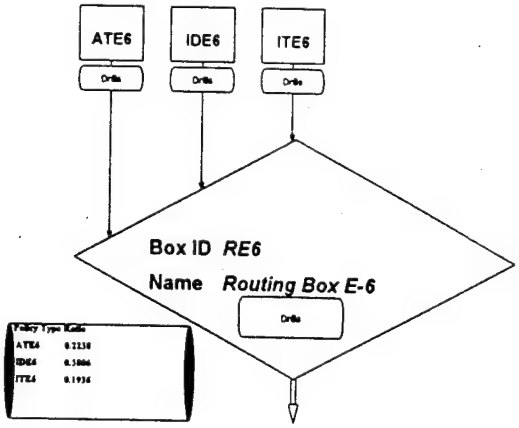


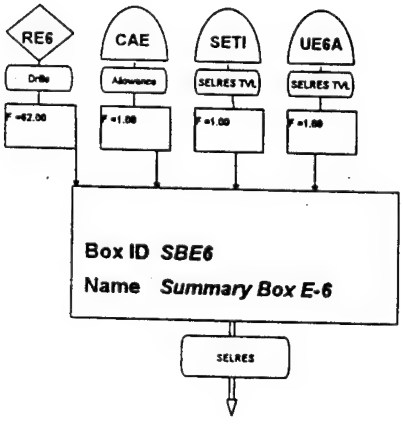


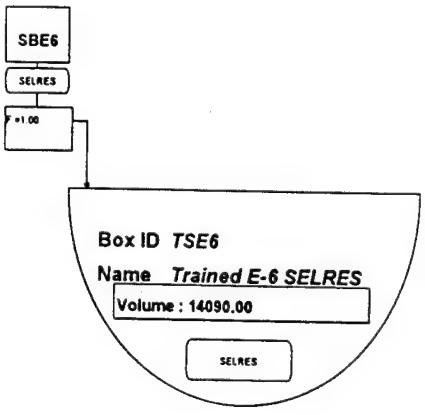

TTE6
Drills
F =1.00
Box ID ITE6
Inactive Duty Training Tvl E-6
Drills


DTE6
Drills
F =1.00
Box ID IDE6
Inactive Duty Training E-6
Drills

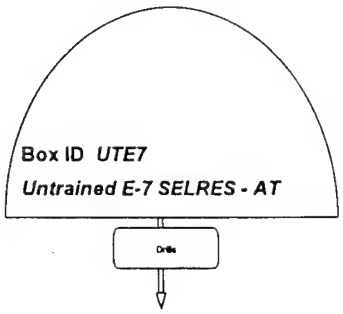

UTE6
Drills
F =1.00
Box ID ATE6
Name Annual Training E-6
Drills

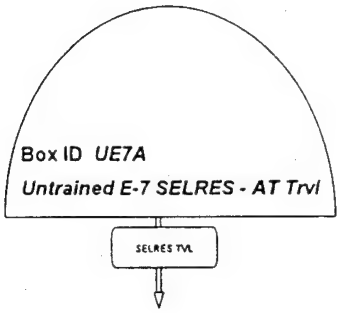

ATE6
IDE6
ITE6
Drills
Box ID RE6
Name Routing Box E-6
Drills

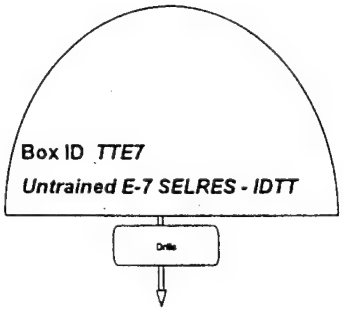

RE6
CAE
SETI
UE6A
Drills
Allowance
SELRES TVL
SELRES TVL
F =1.00
F =1.00
F =1.00
Box ID SBE6
Name Summary Box E-6
SELRES

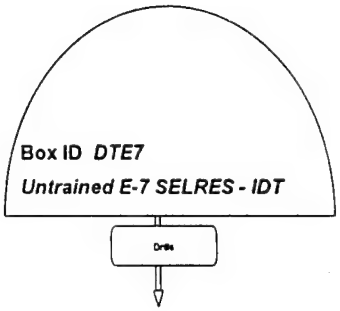

SBE6
SELRES
F =1.00
Box ID TSE6
Name Trained E-6 SELRES
Volume : 14090.00
SELRES

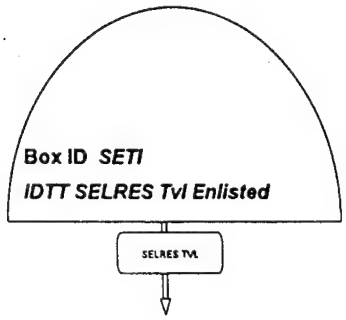
APPENDIX H. GRAPHICAL DEPICTION OF E-7 SUBMODEL

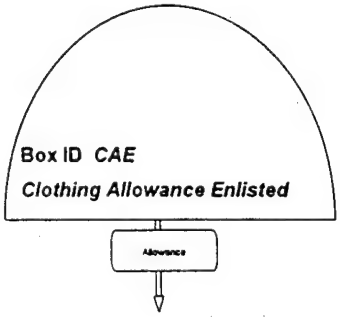


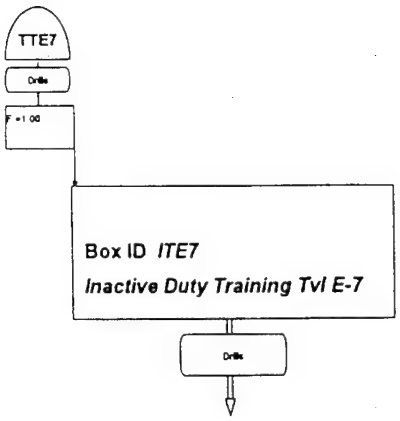


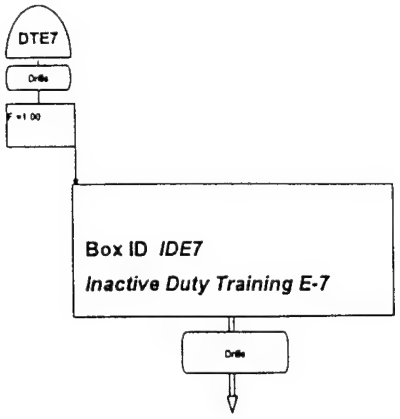


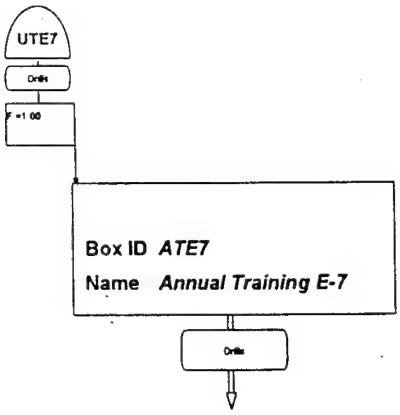


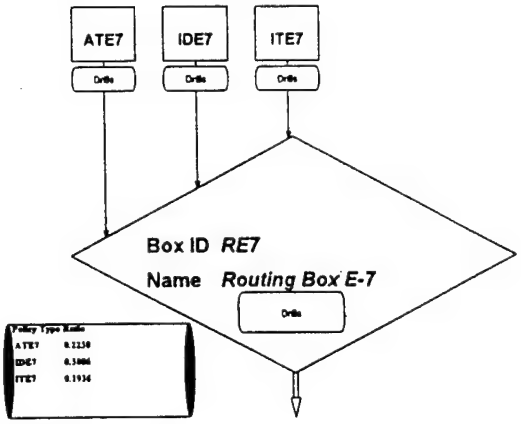


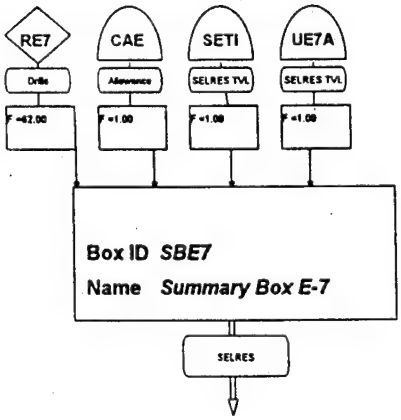


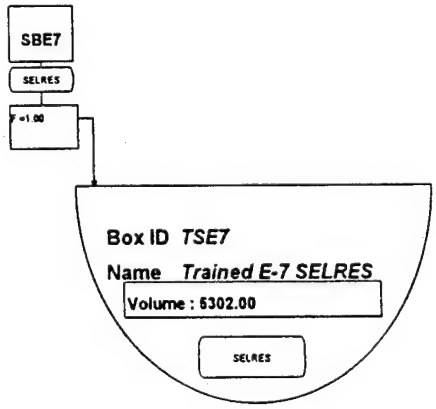

TTE7
Drills
F =1.00
Box ID ITE7
Inactive Duty Training Tvl E-7
Drills


DTE7
Drills
F =1.00
Box ID IDE7
Inactive Duty Training E-7
Drills

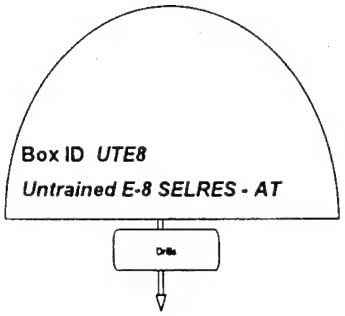

UTE7
Drills
F =1.00
Box ID ATE7
Name Annual Training E-7
Drills

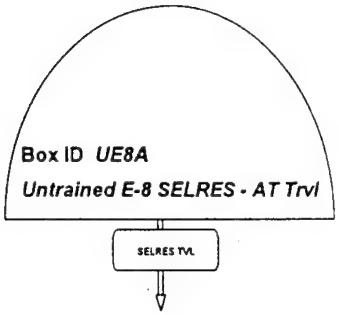

ATE7
IDE7
ITE7
Drills
Box ID RE7
Name Routing Box E-7
Drills

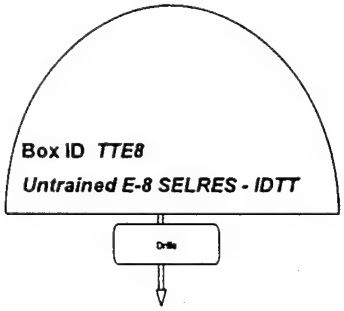

RE7
CAE
SETI
UE7A
Drills
Allowance
SELRES TVL
SELRES TVL
F =62.00
F =1.00
F =1.00
F =1.00
Box ID SBE7
Name Summary Box E-7
SELRES

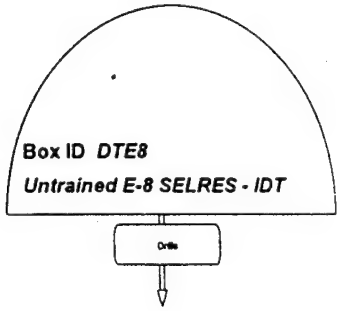

SBE7
SELRES
F =1.00
Box ID TSE7
Name Trained E-7 SELRES
Volume : 6302.00
SELRES

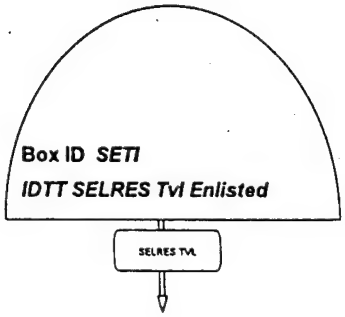
APPENDIX I. GRAPHICAL DEPICTION OF E-8 SUBMODEL

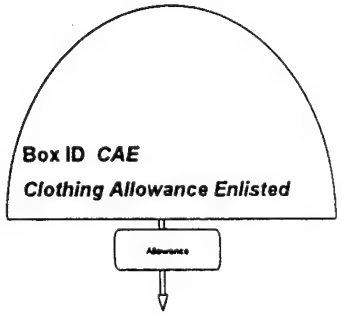


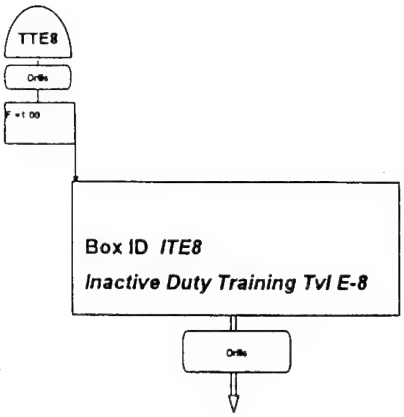


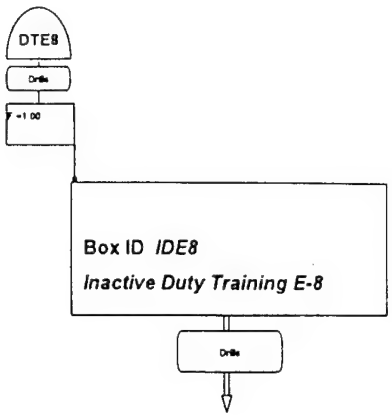


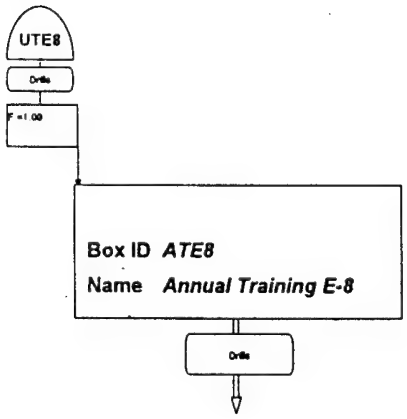


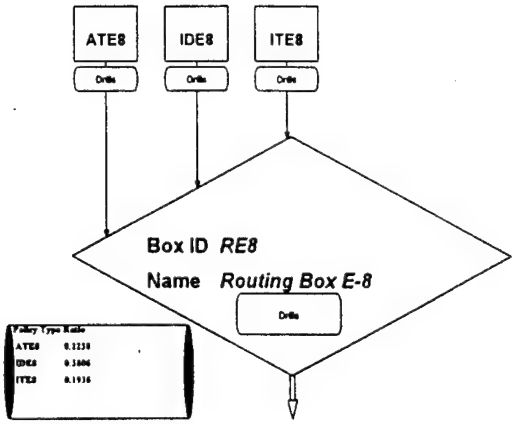


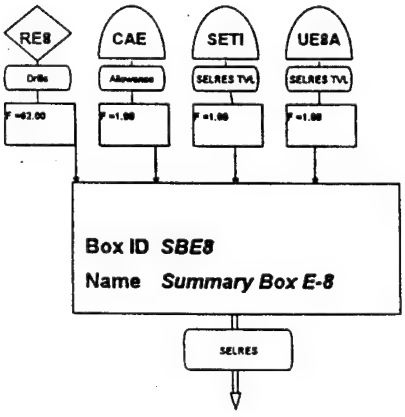


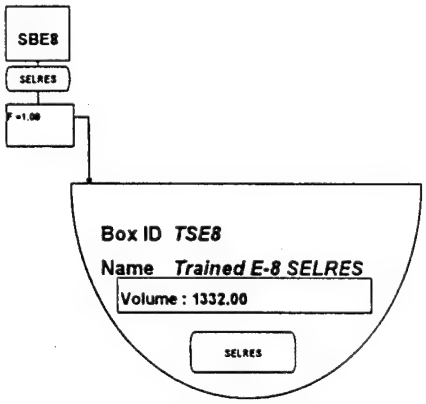

TTE8
Drills
F = 1.00
Box ID ITE8
Inactive Duty Training Tvl E-8
Drills


DTE8
Drills
F = 1.00
Box ID IDE8
Inactive Duty Training E-8
Drills

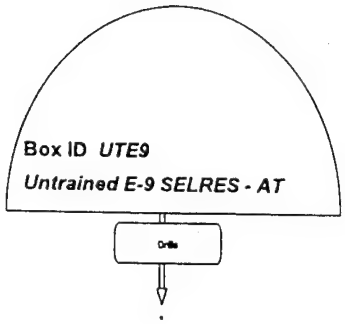

UTE8
Drills
F = 1.00
Box ID ATE8
Name Annual Training E-8
Drills

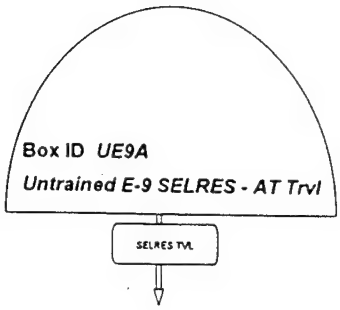

ATE8
IDE8
ITE8
Drills
Box ID RE8
Name Routing Box E-8
Drills

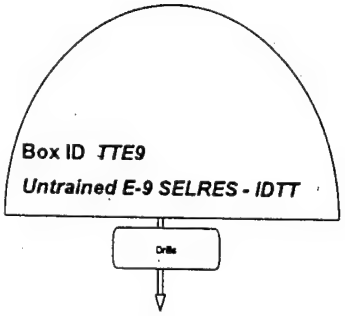

RE8
CAE
SETI
UE8A
Drills
Allowance
SELRES TVL
SELRES TVL
F =62.00
F =1.00
F =1.00
F =1.00
Box ID SBE8
Name Summary Box E-8
SELRES

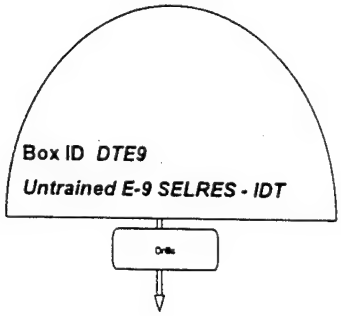

SBE8
SELRES
F =1.00
Box ID TSE8
Name Trained E-8 SELRES
Volume : 1332.00
SELRES

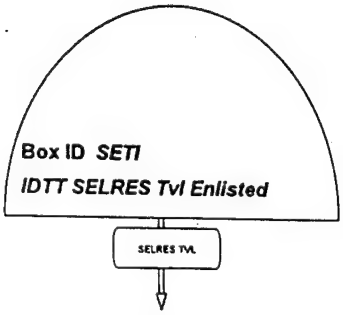
APPENDIX J. GRAPHICAL DEPICTION OF E-9 SUBMODEL

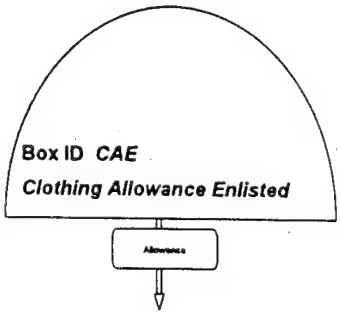


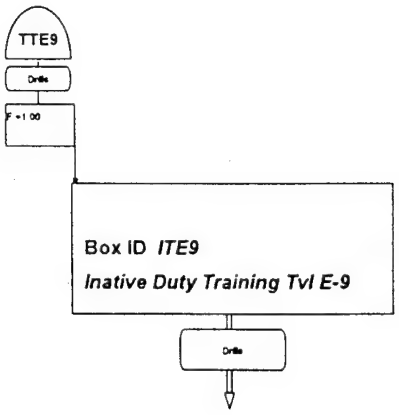


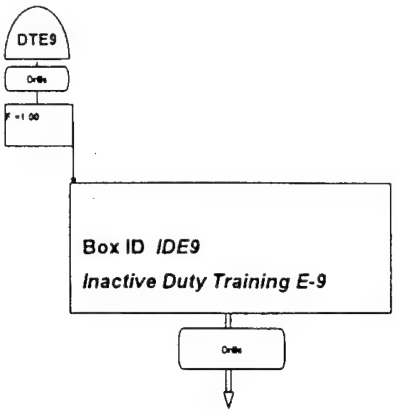


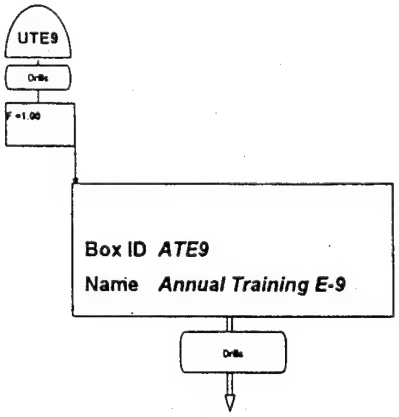


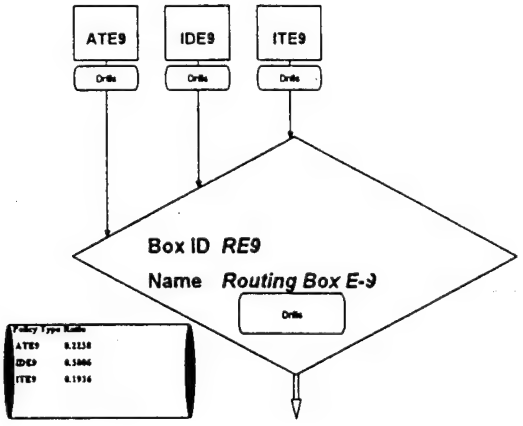


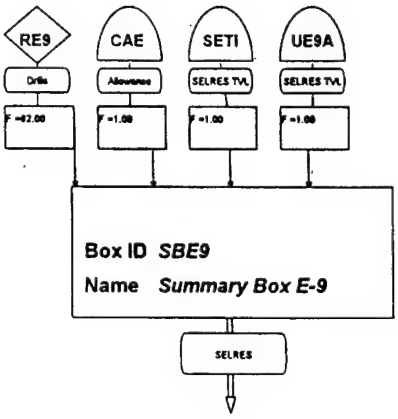


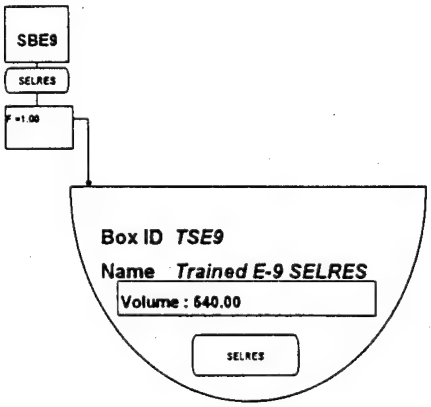

TTE9
Box ID ITE9
Inative Duty Training Tvl E-9


DTE9
Box ID IDE9
Inactive Duty Training E-9

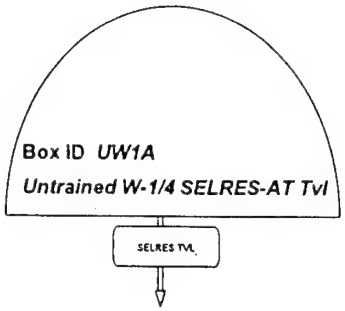

UTE9
Box ID ATE9
Name Annual Training E-9

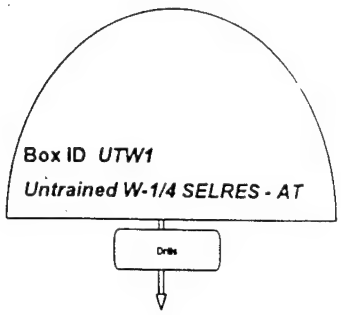

ATE9
IDE9
ITE9
Box ID RE9
Name Routing Box E-9

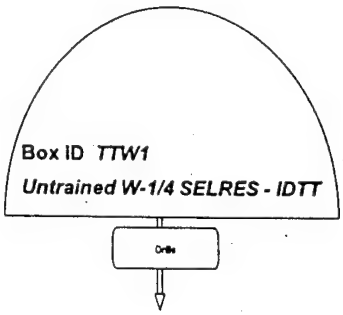

RE9
CAE
SETI
UE9A
Box ID SBE9
Name Summary Box E-9
SELRES

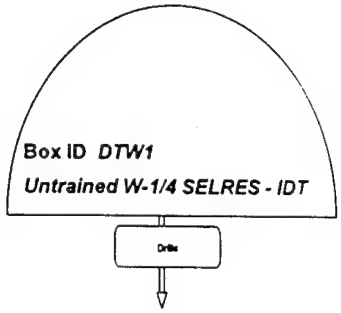

SBE9
SELRES
Box ID TSE9
Name Trained E-9 SELRES
Volume : 640.00
SELRES

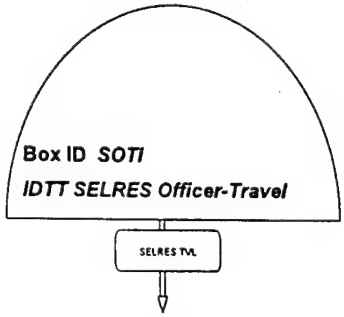
APPENDIX K. GRAPHICAL DEPICTION OF W-1/4 SUBMODEL

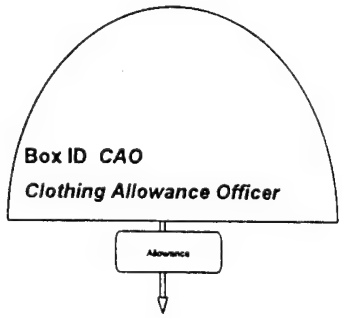


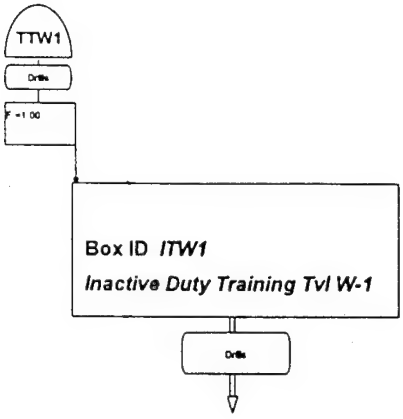


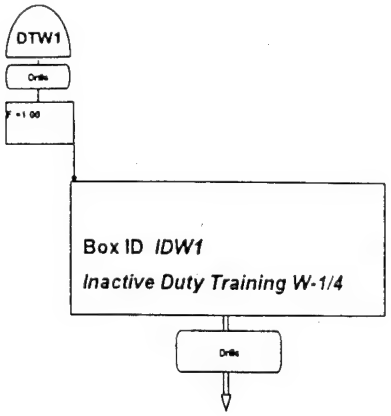


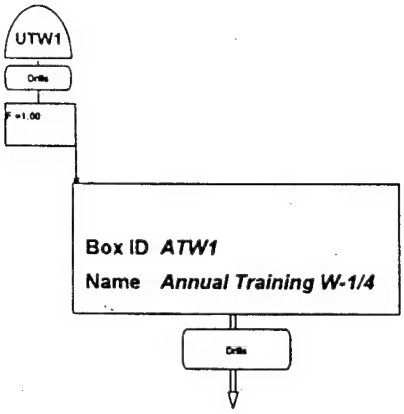


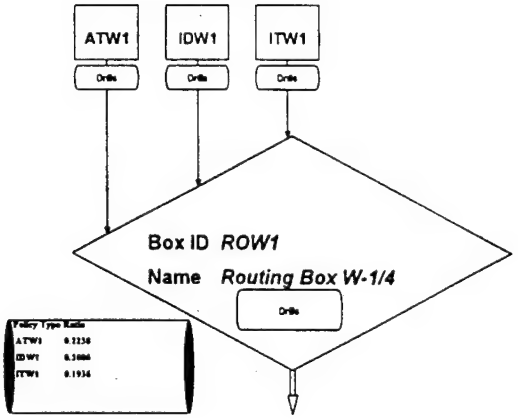


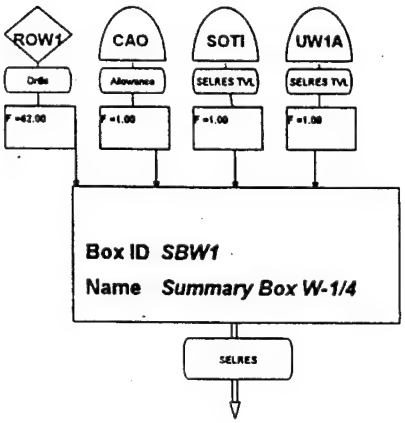


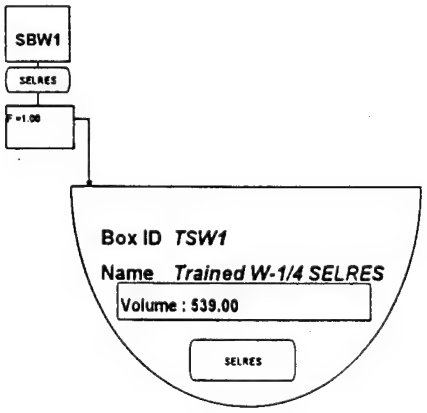

TTW1
Box ID ITW1
Inactive Duty Training Tvl W-1


DTW1
Box ID IDW1
Inactive Duty Training W-1/4

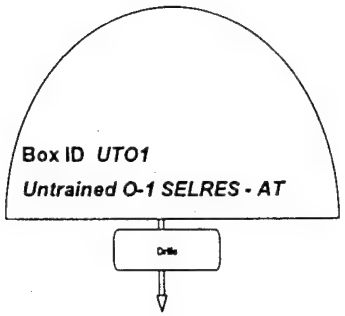

UTW1
Box ID ATW1
Name Annual Training W-1/4

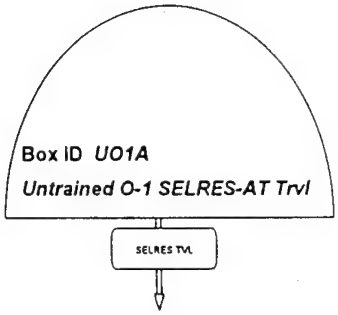

ATW1
IDW1
ITW1
Box ID ROW1
Name Routing Box W-1/4

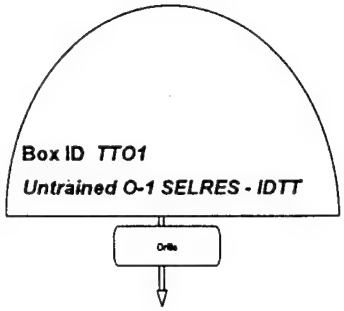

ROW1
CAO
SOTI
UW1A
Box ID SBW1
Name Summary Box W-1/4
SELRES

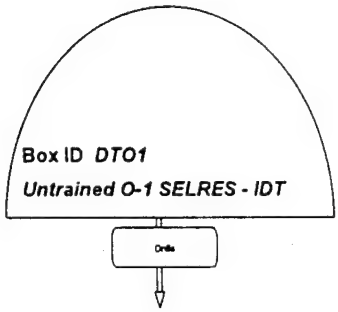

SBW1
Box ID TSW1
Name Trained W-1/4 SELRES
Volume : 539.00
SELRES

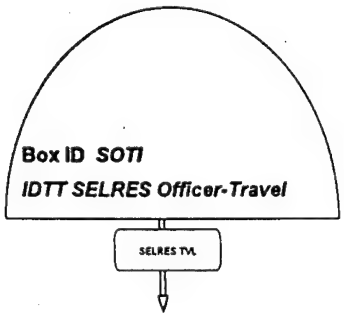
APPENDIX L. GRAPHICAL DEPICTION OF O-1 SUBMODEL

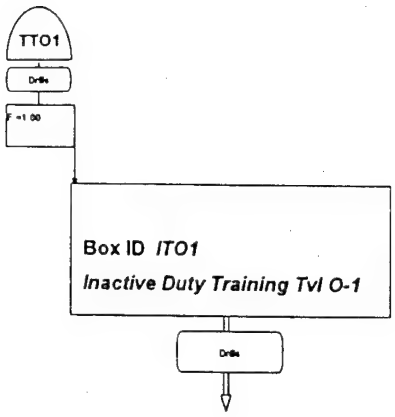


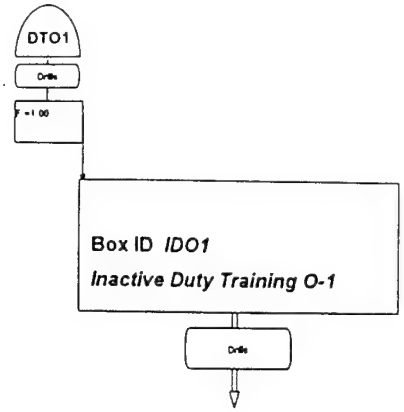


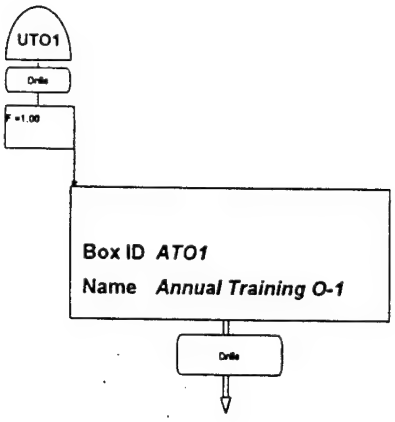


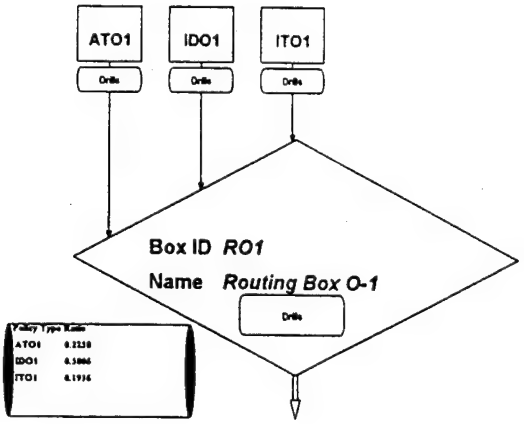


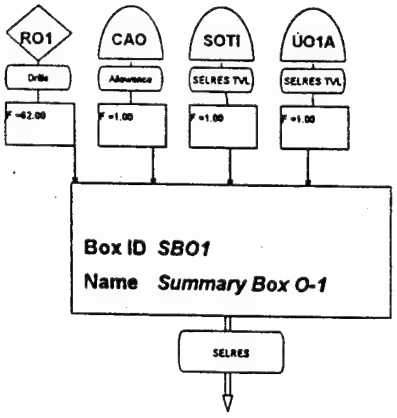


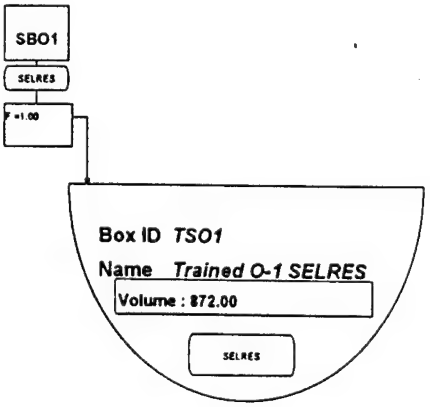

TTO1
Box ID ITO1
Inactive Duty Training Tvl O-1


DTO1
Box ID IDO1
Inactive Duty Training O-1

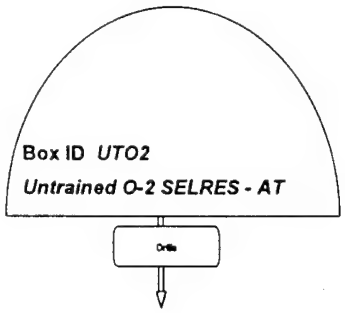

UTO1
Box ID ATO1
Name Annual Training O-1

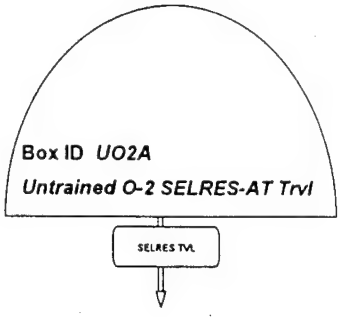

ATO1
IDO1
ITO1
Box ID RO1
Name Routing Box O-1

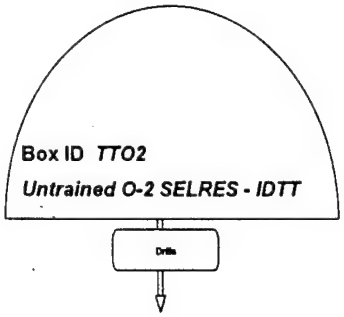

RO1
CAO
SOTI
UO1A
SELRES TVL
SELRES TVL
Box ID SBO1
Name Summary Box O-1
SELRES

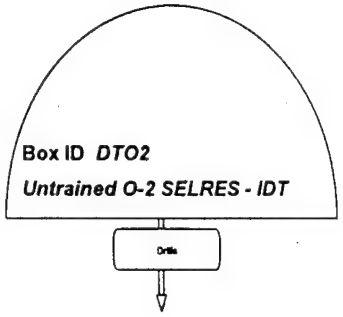

SBO1
SELRES
Box ID TSO1
Name Trained O-1 SELRES
Volume : 872.00
SELRES

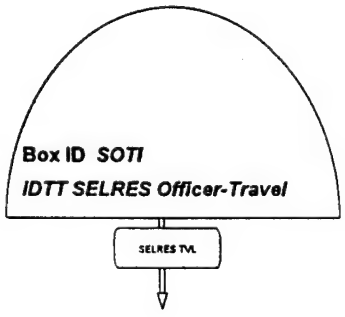
APPENDIX M. GRAPHICAL DEPICTION OF O-2 SUBMODEL

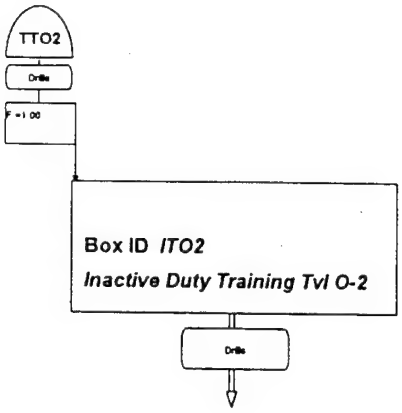


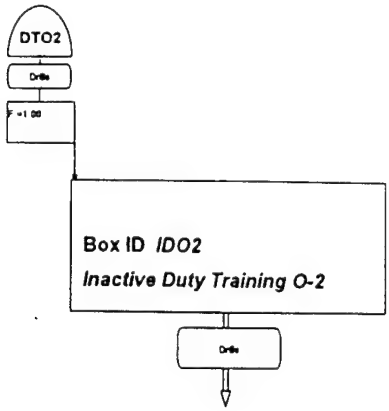


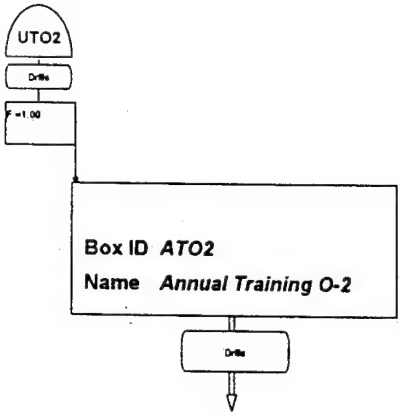


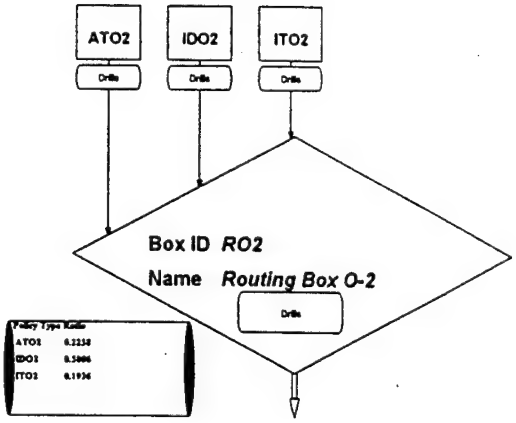


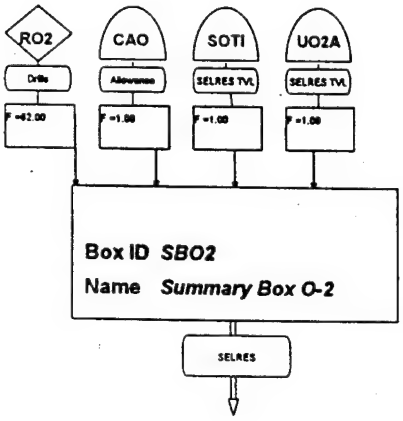


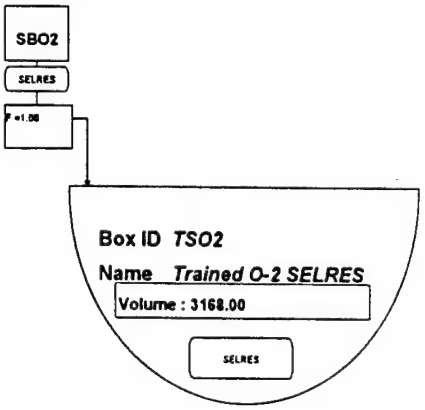

TTO2
Box ID ITO2
Inactive Duty Training Tvl O-2


DTO2
Box ID IDO2
Inactive Duty Training O-2

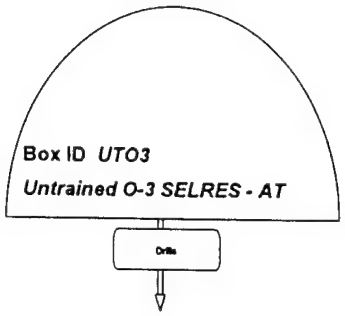

UTO2
Box ID ATO2
Name Annual Training O-2

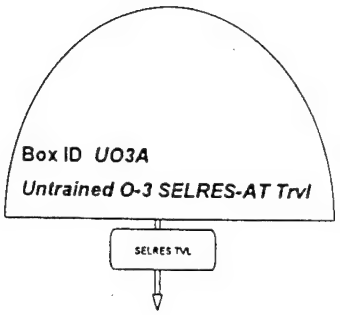

ATO2
IDO2
ITO2
Box ID RO2
Name Routing Box O-2

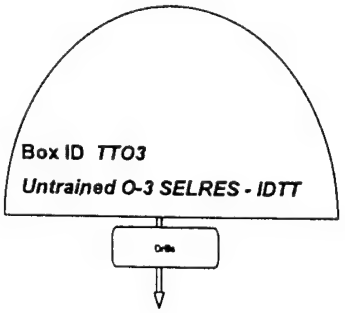

RO2
CAO
SOTI
UO2A
Box ID SBO2
Name Summary Box O-2
SELRES

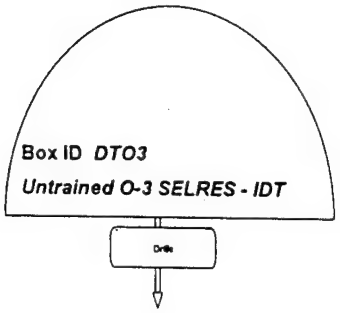

SBO2
SELRES
Box ID TSO2
Name Trained O-2 SELRES
Volume : 3168.00
SELRES

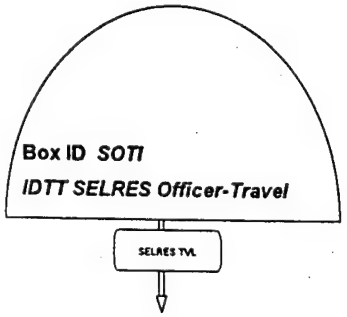
APPENDIX N. GRAPHICAL DEPICTION OF O-3 SUBMODEL

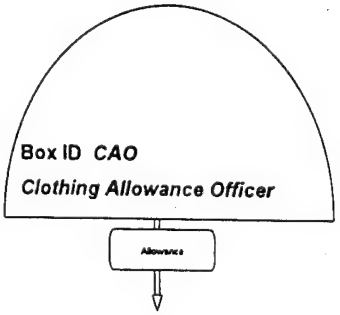


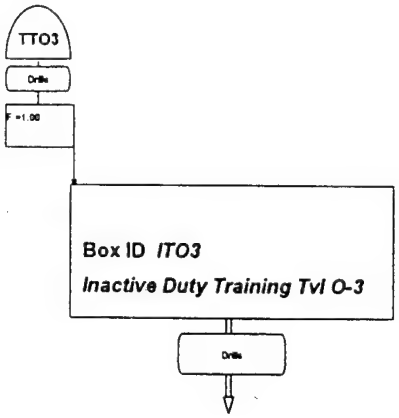


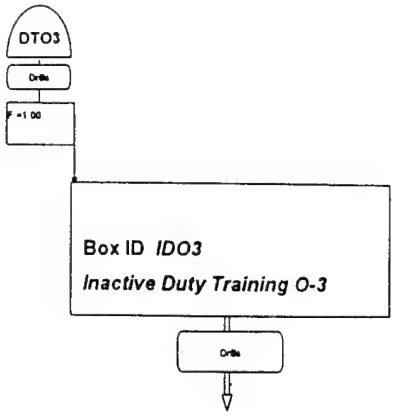


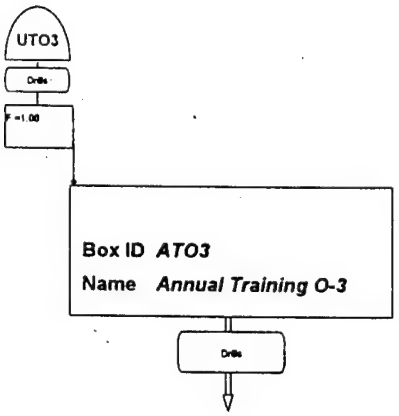


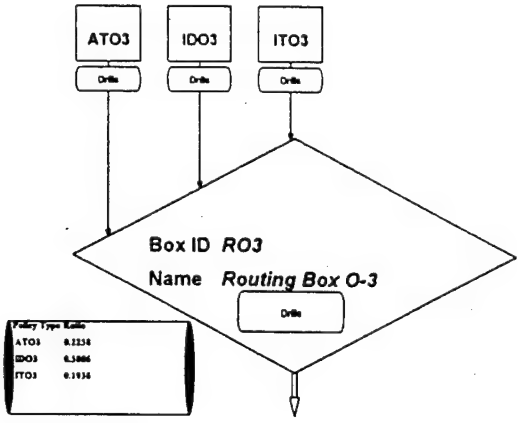


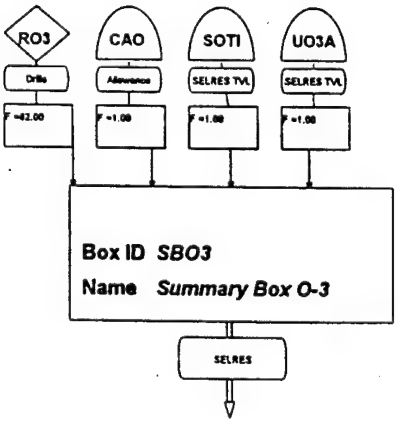


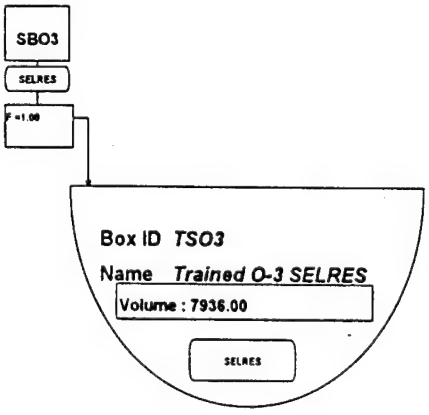

TTO3
Drills
F =1.00
Box ID ITO3
Inactive Duty Training Tvl O-3
Drills


DTO3
Drills
F =1.00
Box ID IDO3
Inactive Duty Training O-3
Drills

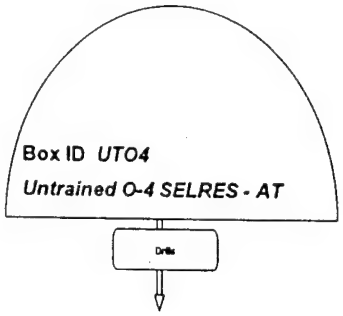

UTO3
Drills
F =1.00
Box ID ATO3
Name Annual Training O-3
Drills

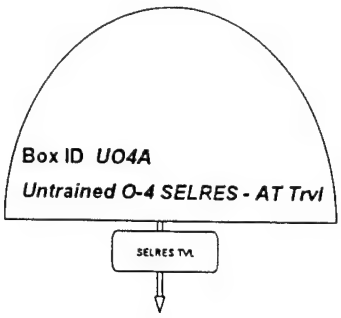

ATO3
IDO3
ITO3
Drills
Box ID RO3
Name Routing Box O-3
Drills

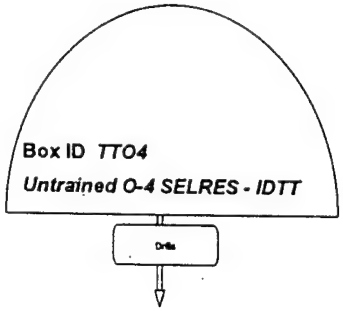

RO3
CAO
SOTI
UO3A
Drills
Allowance
SELRES TVL
SELRES TVL
F =42.00
F =1.00
F =1.00
F =1.00
Box ID SBO3
Name Summary Box O-3
SELRES

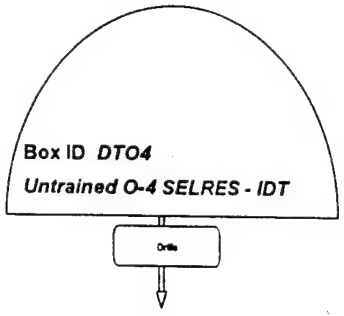

SBO3
SELRES
F =1.00
Box ID TSO3
Name Trained O-3 SELRES
Volume : 7936.00
SELRES

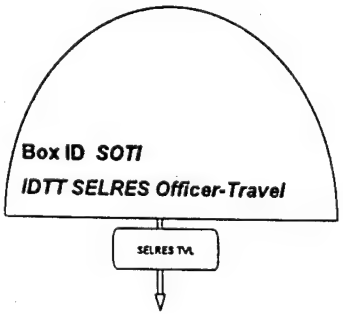
APPENDIX O. GRAPHICAL DEPICTION OF O-4 SUBMODEL

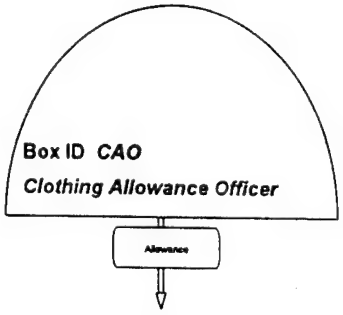


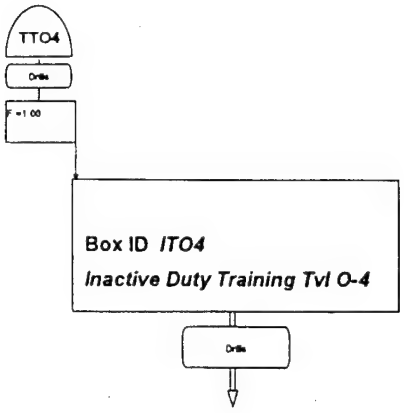


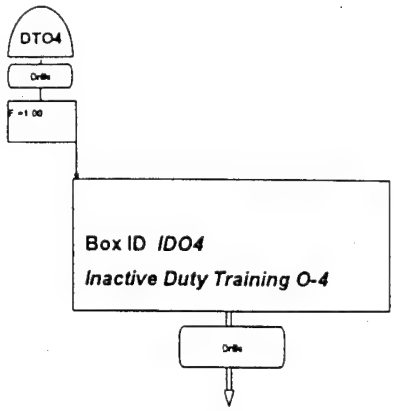


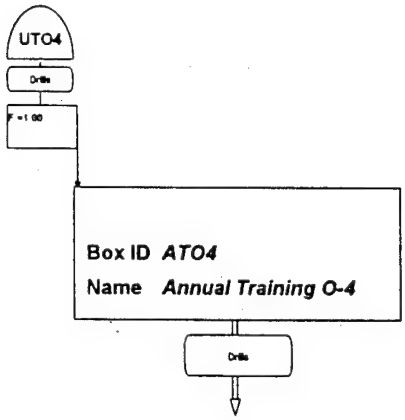


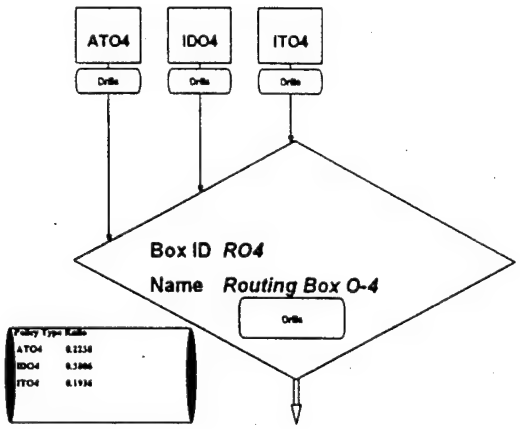


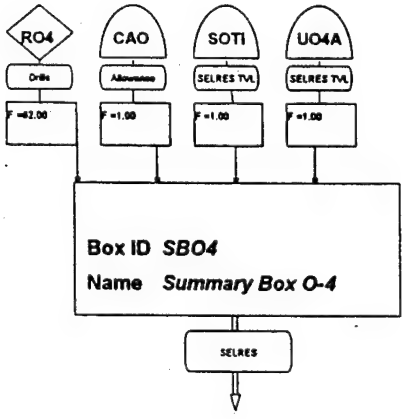


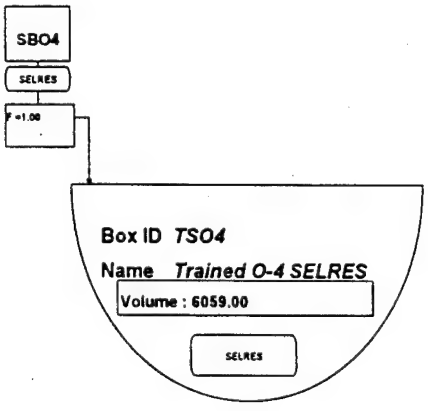

TTO4
Box ID ITO4
Inactive Duty Training Tvl O-4


DTO4
Box ID IDO4
Inactive Duty Training O-4

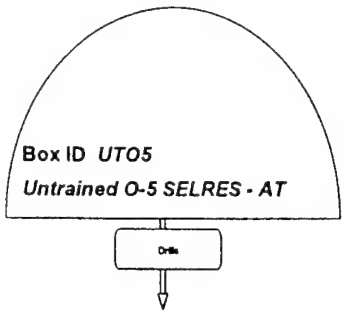

UTO4
Box ID ATO4
Name Annual Training O-4

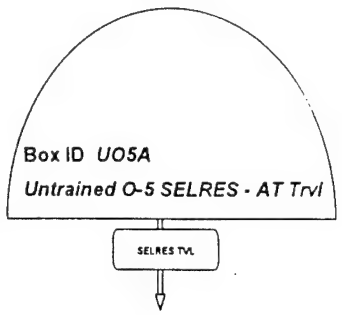

ATO4
IDO4
ITO4
Box ID RO4
Name Routing Box O-4

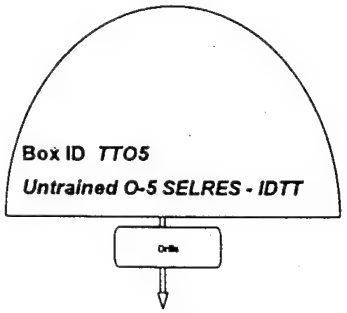

RO4
CAO
SOTI
UO4A
Box ID SBO4
Name Summary Box O-4
SELRES

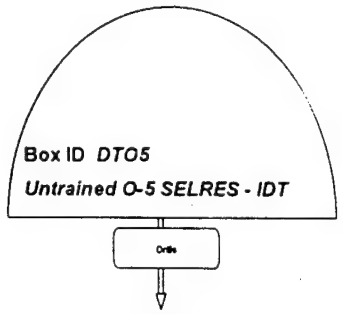

SBO4
SELRES
Box ID TSO4
Name Trained O-4 SELRES
Volume : 6059.00
SELRES

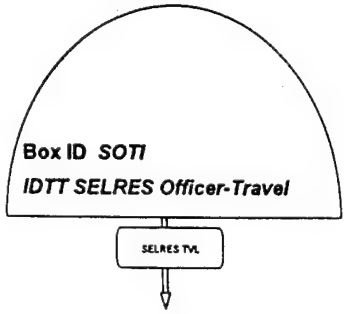
APPENDIX P. GRAPHICAL DEPICTION OF O-5 SUBMODEL

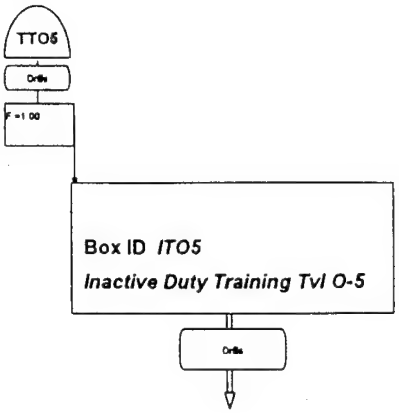


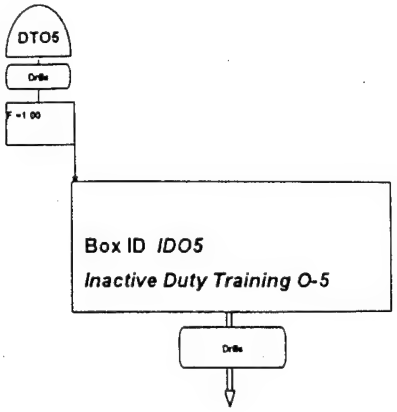


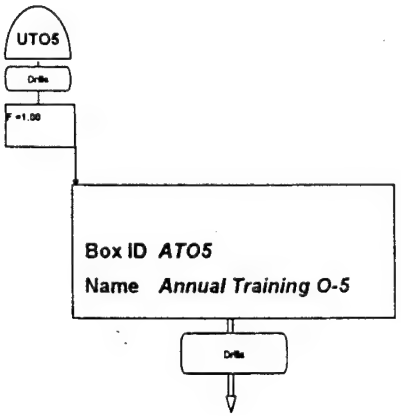


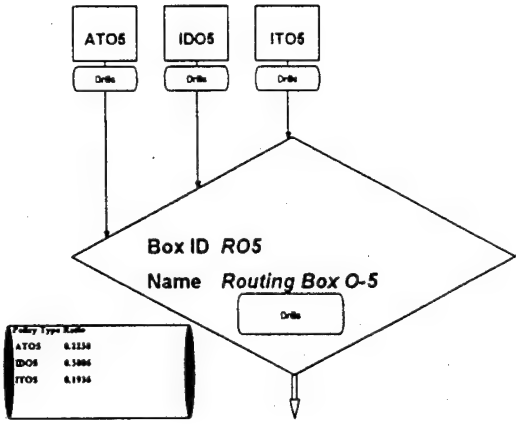


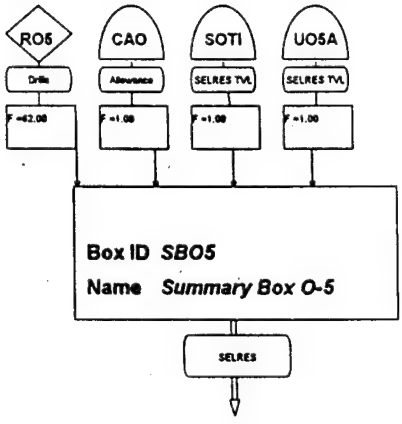


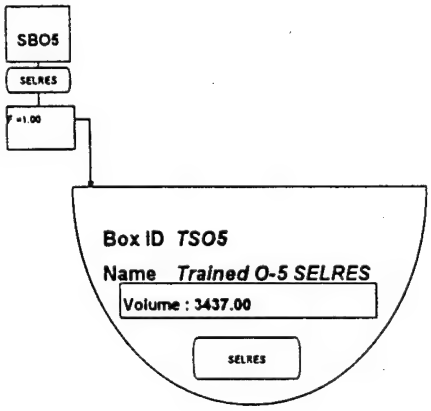

TTO5
Box ID ITO5
Inactive Duty Training Tvl O-5


DTO5
Box ID IDO5
Inactive Duty Training O-5

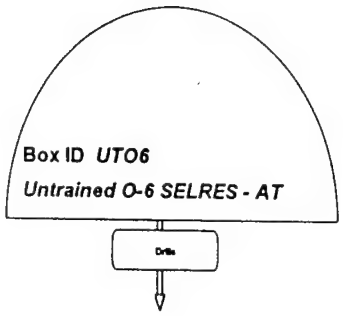

UTO5
Box ID ATO5
Name Annual Training O-5

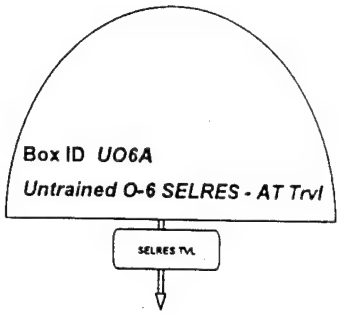

ATO5
IDO5
ITO5
Box ID RO5
Name Routing Box O-5

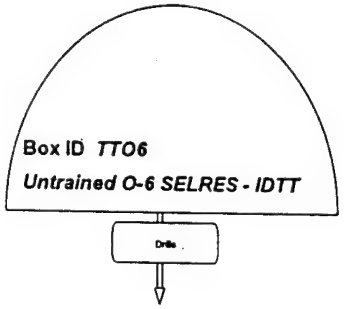

RO5
CAO
SOTI
UO5A
Box ID SBO5
Name Summary Box O-5
SELRES

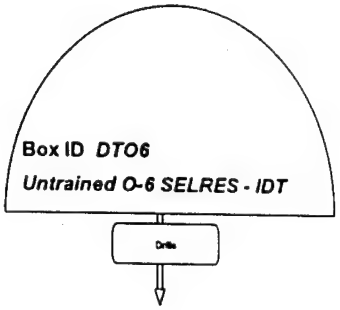

SBO5
SELRES
Box ID TSO5
Name Trained O-5 SELRES
Volume : 3437.00
SELRES

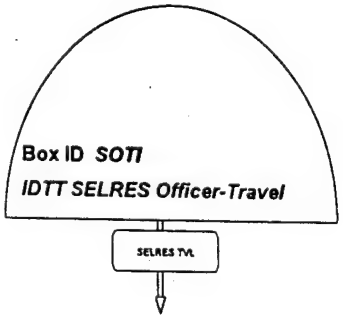
APPENDIX Q. GRAPHICAL DEPICTION OF O-6 SUBMODEL

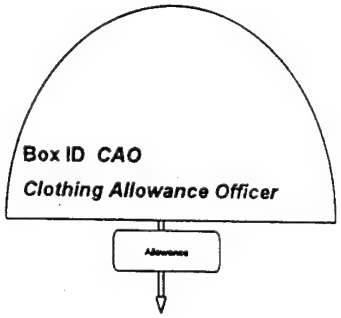


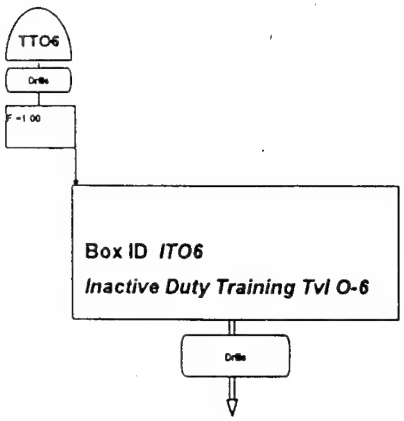


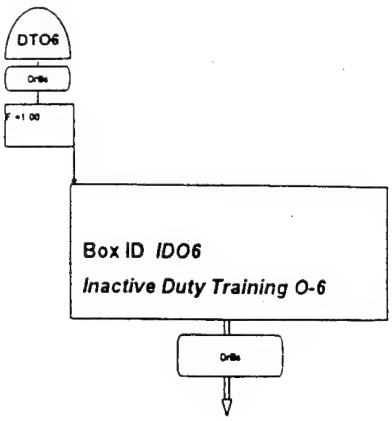


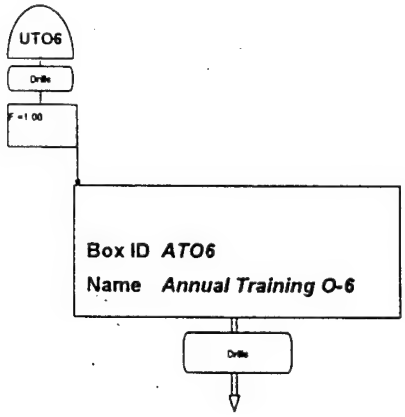


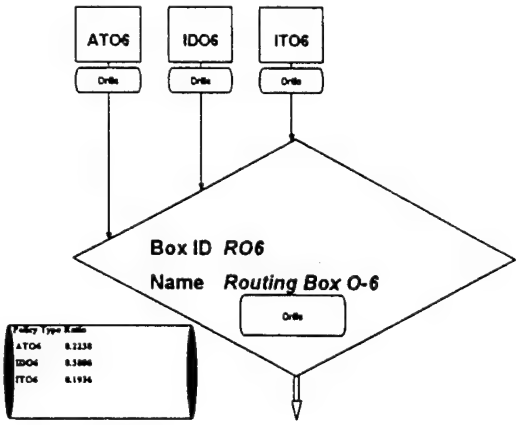


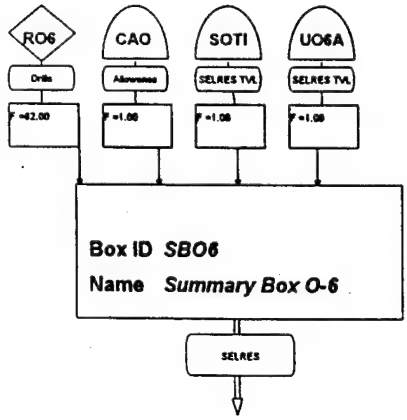


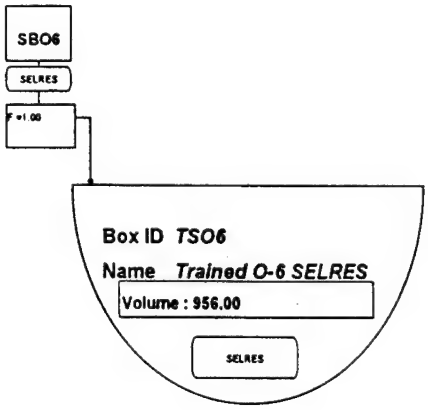

TTO6
Box ID ITO6
Inactive Duty Training Tvl O-6


DTO6
Box ID IDO6
Inactive Duty Training O-6

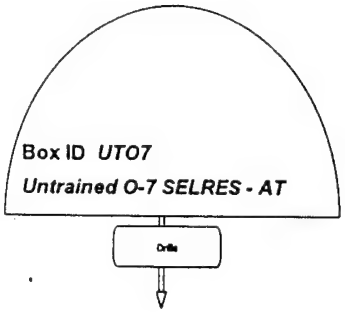

UTO6
Box ID ATO6
Name Annual Training O-6

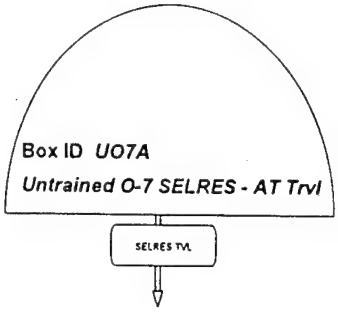

ATO6
IDO6
ITO6
Box ID RO6
Name Routing Box O-6

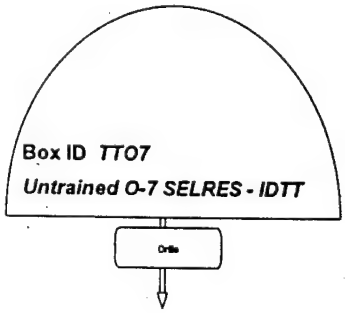

RO6
CAO
SOTI
UO6A
Box ID SBO6
Name Summary Box O-6
SELRES

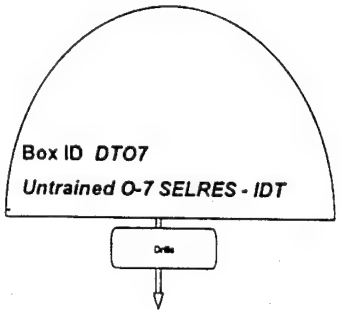

SBO6
SELRES
Box ID TSO6
Name Trained O-6 SELRES
Volume : 956.00
SELRES

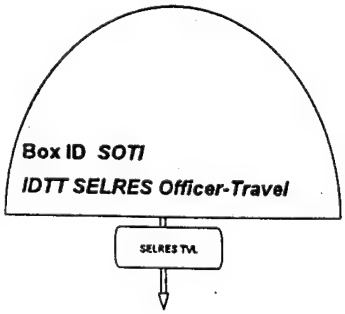
APPENDIX R. GRAPHICAL DEPICTION OF O-7 SUBMODEL

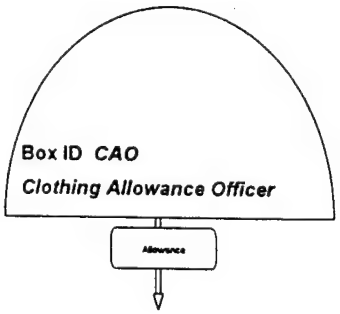


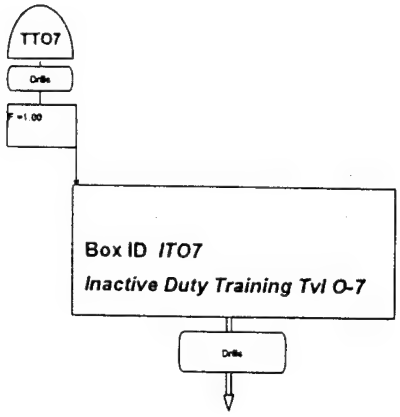


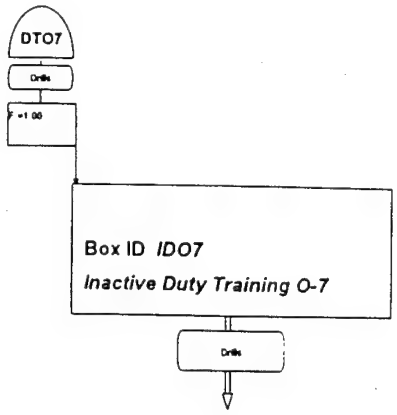


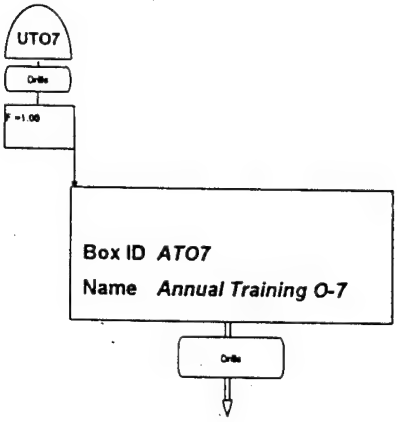


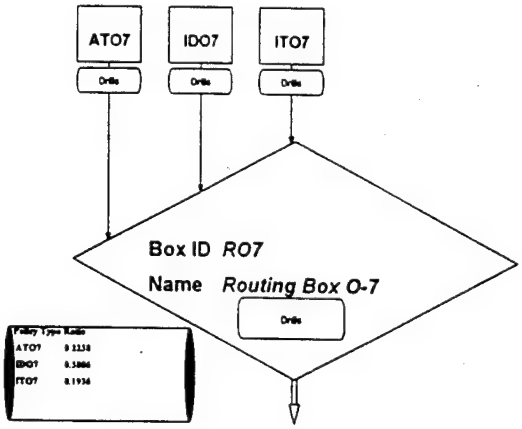


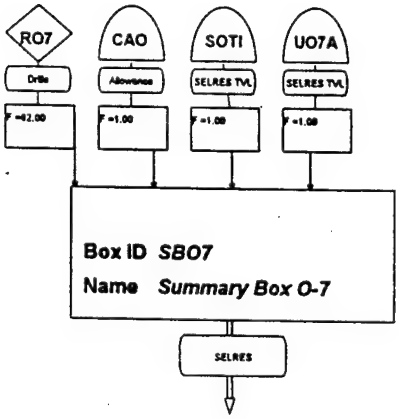


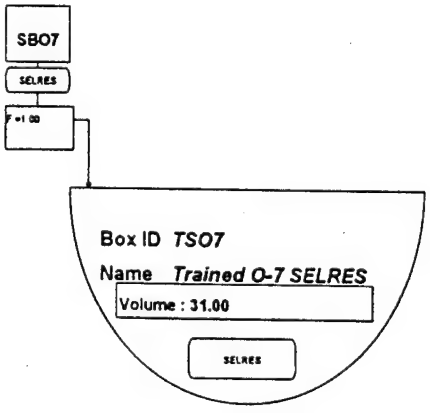

TTO7
Box ID ITO7
Inactive Duty Training Tvl O-7


DTO7
Box ID IDO7
Inactive Duty Training O-7

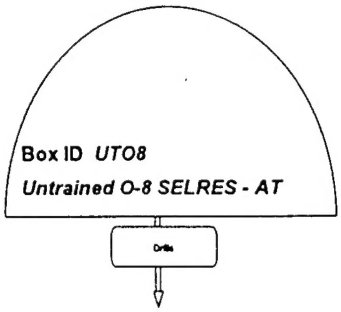

UTO7
Box ID ATO7
Name Annual Training O-7

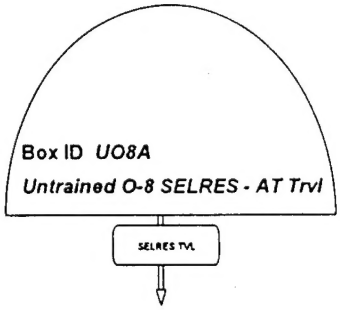

ATO7
IDO7
ITO7
Box ID RO7
Name Routing Box O-7

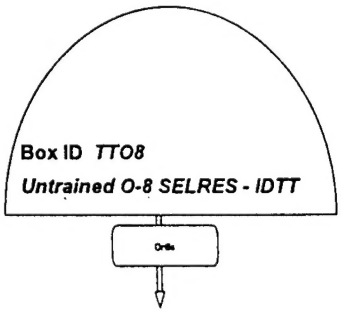

RO7
CAO
SOTI
UO7A
Box ID SBO7
Name Summary Box O-7
SELRES

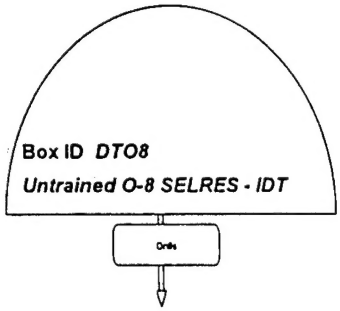

SBO7
SELRES
Box ID TSO7
Name Trained O-7 SELRES
Volume : 31.00
SELRES

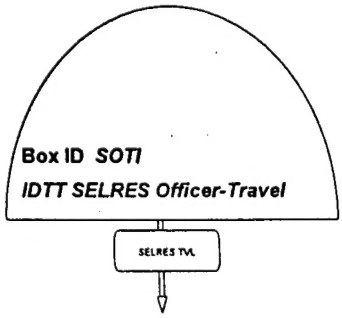
APPENDIX S. GRAPHICAL DEPICTION OF O-8 SUBMODEL

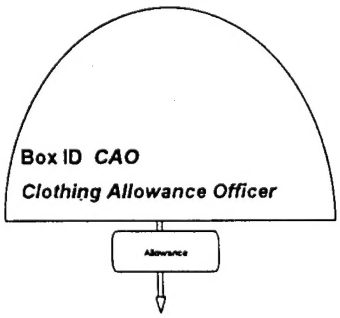


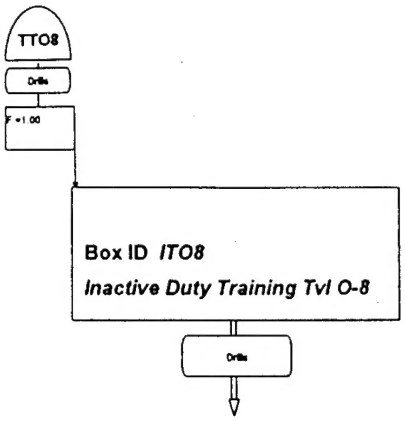


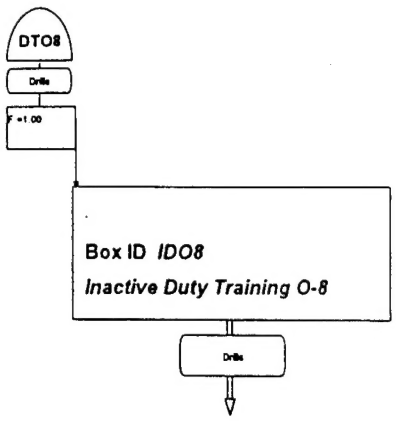


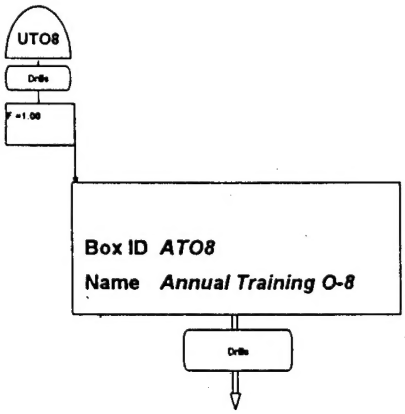


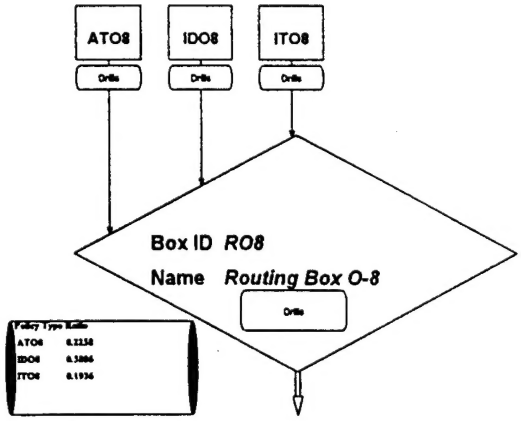


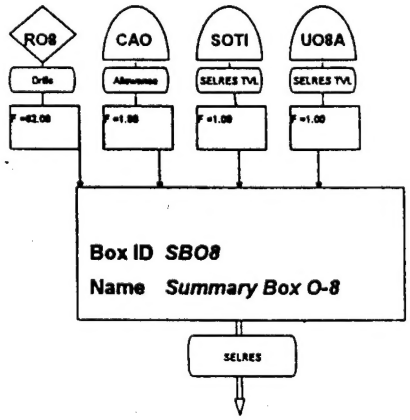


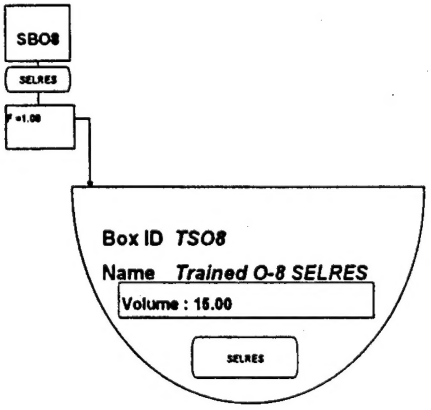

TTO8
Drills
F =1.00
Box ID ITO8
Inactive Duty Training Tvl O-8
Drills


DTO8
Drills
F =1.00
Box ID IDO8
Inactive Duty Training O-8
Drills


UTO8
Drills
F =1.00
Box ID ATO8
Name Annual Training O-8
Drills


ATO8
IDO8
ITO8
Drills
Box ID RO8
Name Routing Box O-8
Drills
Policy Type Ratio
ATO8 0.2258
IDO8 0.3866
ITO8 0.1936


RO8
CAO
SOTI
UO8A
Drills
Allowance
SELRES TVL
SELRES TVL
F =1.00
F =1.00
Box ID SBO8
Name Summary Box O-8
SELRES


SBO8
SELRES
F =1.00
Box ID TSO8
Name Trained O-8 SELRES
Volume : 15.00
SELRES

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